

# HIGH SCHOOL MANUAL

— FOR —  
SOUTH DAKOTA



1922

Published by  
**J. FRED OLANDER COMPANY**  
*Official Publishers*  
Pierre, South Dakota



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Revised under the direction of  
**FRED L. SHAW**  
Superintendent of Public Instruction

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Superintendent of Public Instruction.



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# FOREWORD

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## **Preparation.**

The high school course of study under which we have been working was made out by a committee appointed by Superintendent C. H. Lugg, at the suggestion of the high school executives' meeting at Deadwood in 1914. Since then conditions have so changed and so many different courses have been called for by the high schools of the State that that course fails to meet our needs. In 1921, at a meeting of the South Dakota Education Association at Huron, the high school executives requested the State Superintendent of Public Instruction to appoint a committee to prepare a new course. Such a committee was appointed in the spring of 1922 by Hon. Fred L. Shaw, State Superintendent of Public Instruction, and this course is the result of the work of that committee, under the direction of Mr. Shaw. Many other courses of study have been gleaned from and many of the high school teachers of the State have assisted in preparing the material. The committee regrets that the list of those who were consulted is too long to be given personal mention but desires to thank each and all for the help given.

## **Smith-Hughes Courses**

The courses in Smith-Hughes Agriculture, Smith-Hughes Home Economics and Smith-Hughes Trades and Industries are not included in this Manual but are published in a separate bulletin. Anyone interested in these courses should write to the Department of Public Instruction for copies of the bulletin. Many of the high schools of the State are now giving them and drawing aid from the State and Federal Governments. These courses are especially desirable for pupils who are not planning to take a college course after finishing high school.

## **The Purpose**

This course is put out as a **guide** for the various high schools but not with the intention that it shall be a hard and fast rule to which all the work of the State must conform. It is rather a statement of the essentials that should form the basis of our high school course. It is not desired that every high school in the State should follow identically the same course of study but it is desirable that every high school graduate should have all the constants required. The work as outlined should, we believe, form the **basis** of every high school course in the State, leaving each school free to add to the requirements or develop the course as local conditions demand and resources permit.

It is advised, however, that those who are unfamiliar with conditions in South Dakota or those who have had little experience in high school work shall conform as nearly as possible to the courses as here outlined. It is also essential that, when a course of study has been formulated for any particular school and adopted by the Board of Education for that school, it be not changed to suit the whim of every new teacher. **"Secure teachers to fit the course rather than get courses to fit the teachers."**

REVISION COMMITTEE.

## INTRODUCTION

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The revision committee presents herein the results of their effort. I have approved the work as well done. It is left to the principal and high school teachers in each high school to adapt the course to fit the needs of the community. As stated by the committee, it is not expected nor desired that all high schools have the same course of study. It is desired, however, that as nearly as possible each high school meet the standards set, and that the course of study in the high schools of the state shall contain the required eight constants.

Each high school should guard well its entrance requirements. No pupil should be encouraged to leave the grades and undertake high school work who has not received an eighth grade diploma granted by a county superintendent or one that can be endorsed by him, or its equivalent. This will enable such pupil to take advantage of the free high school tuition law, should he establish a residence in a district wherein no high school is maintained. Pupils coming from non-accredited high schools to accredited ones should be required to establish by proper tests the quality of the non-accredited work before credit is given upon it. Credit should be given only when the quality of the work is as high as is required in the school where the work is accepted. Do not cheapen quality to get numbers. Let us look forward to the time when little high school work will be undertaken that can not be accredited. "Not how much but how well" is a good motto.

The promotions will be made under the supervision of the principal and high school faculty. For many reasons the Department of Public Instruction does not prepare nor send out examination questions for high schools. The entire supervision of the promotions is left to each high school faculty for its school. I am sure this responsibility will be well cared for. This course is not perfect, but it shows progress. With it as a guide, let us continue to go forward.

FRED L. SHAW,  
Superintendent of Public Instruction.

## ACCREDITMENT OF HIGH SCHOOLS

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### Classification of High Schools.

The accredited high schools of South Dakota shall be classified as One Year, Two Year, Three Year, and Four Year Schools. The requirements of their courses shall be:

One Year Schools—English I, Elementary Algebra and two electives. One teacher required.

Two Year Schools—English I and II, Elementary Algebra, Plane Geometry and four electives. Two teachers required.

Three Year School—Six constants (including those given for Two Year School), and six electives. Two teachers required.

Four Year Schools—All of the constants of this course and not less than seven electives. Three teachers at least required. **No alternation allowed.**

### Standards of Accreditation.

A high school to be recognized as an Accredited High School must meet and maintain the following conditions:

1. The location and construction of the buildings, the lighting, heating and ventilation of the rooms, the nature of the lavatories, corridors, closets, water supply, school furniture, apparatus, and methods of cleaning shall be such as to insure hygienic conditions for both pupils and teachers.

2. Not less than fifteen units as defined in this course shall be required for graduation. Sixteen units are recommended.

A UNIT is defined as a course covering an academic year that shall include, in the aggregate, not less than 120 sixty-minute hours of class work, provided that two hours of laboratory work, manual training or domestic science shall be considered equivalent to one hour of class room work.

3. The minimum scholastic attainment of all teachers of academic subjects in high schools shall be fully equivalent to graduation from the University of South Dakota; except that teachers holding Life Diplomas, State or Provisional Certificates issued on or after July 1st, 1919, may teach in the ninth grade.

Note: All teachers above the ninth grade must hold a Life Professional Diploma or a Provisional Diploma issued from the Department of Public Instruction before they can teach above the ninth grade in any high school. ALL TEACHERS must hold VALID CERTIFICATES issued from the Department of Public Instruction BEFORE they can sign a LEGAL CONTRACT with any BOARD OF EDUCATION.

4. The number of daily periods of class room instruction given by any teacher shall not exceed six.

5. All recitation periods shall be at least forty minutes in the clear.

6. The library and laboratory equipment shall be fully adequate to the needs of instruction in the subjects taught and outlined in the high school Manual.

7. No school shall be accredited whose salary schedule is not sufficient to command, and retain teachers whose qualifications are such as required in Standard 3.

8. The efficiency of instruction, the acquired habits of thought and study, the general intellectual and moral tone of a school are paramount factors, and therefore, only schools which rank well in these particulars, as evidenced by thorough-going inspection, shall be considered eligible for accreditation.

9. A permanent record of each pupil's work shall be kept.

10. The Department of Public Instruction shall call for such reports as may be deemed necessary for accrediting.

Note: If the annual report called for under Standard 10 is not in the office of the Department of Public Instruction on the date called for, the school will go on the non-accredited list. If blanks are not received by September 15, each year, the principal should write to the department asking for them.

### CONSTANTS

Constants: The constants, or required subjects, of an approved high school course shall be:

English I, II, III and IV as defined in the High School Manual. 4 units  
 American History and Government ..... 1 unit.  
 Algebra, to Quadratics ..... 1 unit.  
 Plane Geometry ..... 1 unit.  
 Science, one year's work in any of the following ..... 1 unit.

- (1) Physics
- (2) Chemistry
- (3) Physiography
- (4) Biology
- (5) General Science

Electives: The electives of the course shall be (the numeral following each subject indicates the number of unit credit that may be allowed):

Latin ..... 4	French ..... 2
German ..... 2	Spanish ..... 2
Advanced Algebra ..... $\frac{1}{2}$	Solid Geometry ..... $\frac{1}{2}$
Plane Trigonometry ..... $\frac{1}{2}$	Ancient History ..... 1
Modern History ..... 1	English History ..... 1
Sociology ..... $\frac{1}{2}$	Economics ..... $\frac{1}{2}$
Argumentation and Debate ... $\frac{1}{2}$	Public Speaking ..... $\frac{1}{2}$
Bible ..... 1	Art ..... 2
Commercial (as outlined) .... 5	Physical Education ..... $\frac{1}{2}$
Normal Training ..... 3	Domestic Science ..... 1
Agriculture ..... 1	Manual Training ..... 2
Printing ..... 2	Music (see outline)

Note: Credit will not be allowed for American History and Government, Physics or Chemistry, or Trigonometry if given before the third year of the course; or for Economics if given before the fourth year.

## ART

(Ten periods per week, one unit)

This outline is planned upon the idea that "the teaching of Art is vastly more important than the teaching of drawing." It is believed that since Art in high school has been extended to home decoration, dress making, millinery and commercial Art, the pupil, after a two years course, should have a better appreciation and understanding of Art and its relation to life.

### September

1. Copy block letter alphabet.
2. Layout for poster, on 10x14 drawing paper. Observe Greek Law of Margins. Carry out in pencil. Refer to Pencil Sketching by Geo. W. Kotch. (The Prang Co., Chicago)
3. Make poster without background. Carry out in black, white and one intense color. Use illustrator's board 15x20. One line of printing. Suggested subjects: Yarn balls, ink bottles, pencils, pens.
4. On 15x20 illustrator's board make poster advertising football game. Carry out in opaque color. Use simple lettering, school colors and no figures.

### October

Begin study of color theory by giving pupils following notes. Primary colors: red, yellow and blue. Binary colors: orange, green and violet. The Spectrum Circle is the arrangement of the colors in the order in which they appear in the spectrum.

There are three distinct qualities of color:—

1. Hue. A hue is a color tone between a primary and binary color and is made by mixing the primary and binary colors.
2. Value is a term used in reference to the light or dark of a color tone.
3. Intensity. The term intensity when applied to color refers to its brilliancy or personal strength. Tone is a term applied to any spot of color or gray or black or white which the eye recognizes.

A normal color is a color at its fullest intensity.

A tint is a tone lighter than normal.

To neutralize a color add a part of its complement. Complements are colors directly opposite in the spectrum circle, totally unrelated in their normal intensity.

### Harmony and its Laws

There are two kinds of harmony: The Harmony of Likeness or an analogous harmony; the Harmony of Difference or a complementary harmony.

In Analogous Harmony we may use colors between one primary and the next, never crossing the second primary.

In a Complementary Harmony our problem is to make wholly unrelated colors harmonious. Two full intense complements may never be used together except by the introduction of black, white or gray. In this scheme one of the colors must always be neutralized, and usually both.

In a One Mode or Monochromatic Harmony we may use one color only, and must not move from right to left. This harmony includes a tint shade and normal color.

A Triad Harmony is a harmony formed by an equilateral triangle

in the spectrum. In this scheme we must grey or neutralize two of the colors unless we use large areas of black, white or gray.

See that these laws and color schemes are made use of in all following problems.

1. Use a 7x10 illustrator's board. Place board in vertical position and draw border, observing Greek Law of Margins. Leave 2 in. at bottom, 1 in. at sides,  $1\frac{1}{4}$  in. at top. Inside of this draw another border leaving  $\frac{5}{8}$  in. at bottom,  $\frac{3}{8}$  in. at top and  $\frac{1}{4}$  in. at sides. Divide inside space into four vertical rectangles leaving  $\frac{1}{2}$  in. between each. Draw very conventional landscape in one oblong, trace into all four. The two bottom drawings are to be developed in well distributing black, white and gray. Use only black and white for one and introduce gray into the other. The remaining drawings are to be carried out in complementary and analogous harmonies.

2. A still life poster on a 15x20 illustrator's board. Use a tint for a background and keep all objects at eye level.

### November - December

This month and December will be wholly devoted to the designing and enameling of Christmas Gifts. For helpful suggestions for designs turn to "The Use of the Plant in Decorative Design" by Maude Laurence and Caroline Sheldon (Scott, Foresman & Co., Chicago). Any good household enamel will do for the body color. The teacher will find a quart of black and of white enamel enough for a class of about twenty students. One set of Enamelac is a great saving of oil tube paint, which must be mixed with white when applying designs to articles.

Following is a list of articles suitable for decoration: Flower pots, candle sticks, candles, book ends, wicker and tin trays, glass perfume bottles, paper fans, window drops, tea pots, wooden bowls, slipper trees, powder compacts, lamp standards, tin cake and candy boxes.

### January

1. On a 10x15 illustrator's board make side wall elevation using  $\frac{3}{4}$  inch scale. Plan two French doors in proper relation to size of wall and to each other. Tint wall yellow. This problem is to be inked before painting.

2. Place 10x15 illustrator's board in horizontal position and make drawings of windows with curtains. Use  $\frac{3}{4}$  inch scale and ink in. Have the class shop for cretonnes and paint in your design.

3. The simplest style of painted chair and sewing table to be designed by students.

### February

1. Design motives suitable for applying to painted furniture.

2. Room with tinted wall and dining room furniture, preferably serving table with a chair either side of it, no windows. Use plain curtains of a complementary color.

3. Bed room using same scale and no windows, painted bed, bedside table and chair. Use a tint for wall and a complementary color slightly neutralized for furniture.

### March

1. Student to choose style of room and furnish according to his ideas.

2. Original design of cretonne. Nothing more difficult than a drop repeat.

### April

Use Wedding Bristol Board for all the costume problems.

1. Copy Chart 1 of Human Proportion Packet by Eudora Sell-

ner "Drawing of Human Figure" (The Davis Co., Worchester Mass.) or any other well proportioned chart of the adult figure.

2. Make the most careful drawing possible of a hat suitable for a High School girl. Place the hat on hat stand.

3. Make drawings on board, of ruffles, pleats, lace, gathers and other view. Dress to be on form.

#### May

Use knowledge gained through the year to make posters on 15x20 illustrator's board. Suggested Subjects: Furniture, millinery, draperies, books or drug supplies.

### SECOND YEAR

(Ten periods per week, one unit)

#### September

1. Make original alphabet on 15x20 illustrator's board.
2. Foot ball poster, using rather conventional figure, if any.

#### October

1. Have all students make their own cover for notebook to be used throughout the year. The loose leaves to be of white drawing paper,  $8\frac{3}{4} \times 13\frac{3}{4}$  inches. Material for cover to be well contrasted book vellum and mounting paper.

##### Directions

2 large mounting papers,  $8\frac{1}{2} \times 15$  inches.

2 large mounting papers,  $8\frac{3}{4} \times 13\frac{3}{4}$  inches.

2 pieces vellum,  $4 \times 4$  inches.

1 piece vellum,  $4 \times 4$  inches.

1 piece vellum,  $3 \times 13\frac{3}{4}$  inches.

2 card boards,  $9\frac{1}{4} \times 14$  inches.

Cut two corners off of one side of large papers,  $3\frac{1}{2}$  inches each way. Measure and draw lines  $1\frac{1}{2}$  in. from one edge of long side of card boards. Put paste on cardboard and paste down longest piece of vellum (the outside) turn down top and bottom. This leaves 1 in. between the boards. Next paste an inside strip of vellum, finishing the hinges. Cut squares diagonally and paste on outside four corners. Put paste on largest sheet of mounting paper and place on outside covers, smoothing from center out. Turn down edges. Paste in lining. Set four eyelets in cardboard about one inch from top and bottom of both covers. Tie with harmonizing cord.

2. Into note books have students copy color notes of last year, making on one inch squares of white drawing paper, examples of each harmony and definition.

Add the following to these notes:

#### Meaning of Color

"The appropriateness of the color makes for the perfection of the picture."

Black—sin, mourning.

White—purity.

Yellow—(from the sun) supreme wisdom, joyous moods.

Green—truthfulness, hope, youth.

Blue—(from the sky) constancy, truth, peace, contentment.

Red—(from the blood) love, valor.

Orange—(yellow and red) knowledge, benevolence.

Violet—(blue and red) loyalty, patience.

White—the union of all color.

Black—the absence of all color.

#### November

1. On a 15x20 illustrator's board make poster advertising the Christmas sale of gifts for Vantine's or some other Oriental store. This should afford a good opportunity for the use of rich complementary harmonies.

2. Make posters advertising some Bazar to be held in your city. Any church would be glad to furnish the boards in exchange for the advertising value of the posters. This will give the pupils some idea of the commercial value of their work and work wonders in heightening their interest.

3. Begin Christmas problems. Enameling is the best thing from the standpoint of design, color and technique that has been brought into High School for use at this time of year. It is suggested that practically the same type of problems will be planned and carried out as in the first year's work. The designs will, of course, be more interesting and the harmony more beautiful.

### December

Continue enameling.

If the teacher has had work in basketry and in book binding without special equipment, this would be an excellent opportunity to introduce it. Stenciling curtains, scarfs, blouses, and many other useful articles will be found interesting and enjoyable. This is the month to stress color, design and its application. The teacher will find that twice as much knowledge of design will be gained with far less effort on her part than could possibly be expected at any other time of the year.

### January

1. Use as reference either Frank Alvah Parsons "Interior Decoration" or else Elsie de Wolf's "The House in Good Taste." From one of these choose what you consider the most interesting chapters on Period Furniture. Have these read in class and notes taken. Notes should be well written up in the note books. Spend two weeks on this study of furniture.

2. On illustrator's board, 10x15, make side wall elevation for Dining Room to be carried out in some period style. Use old plaster wall and walnut furniture. No windows. Two chairs and buffet to be inked in. Use Burnt Sienna and Sepia (tube colors) for furniture. Wash board with sponge before applying any color.

### February

1. From "The Tapestry book" by Helen Churchill Candee, and "Tapestries" by LeLand Hunter, choose several chapters. Have students prepare reports for class. Take notes and write up as in case of Furniture. Use two weeks of February for the study of Tapestries.

2. On 10x15 in. illustrator's board make elevation for library furnished in Period Style with large library table, one or two chairs, floor lamp and tapestry directly over the table. Be sure that the wall and tapestry are in close harmony. Never use India ink in a tapestry. In putting on these old plaster walls, it will be well to remember that some of the most delightful effects are obtained through repeated washing with a sponge.

### March

1. Make drawing of entry way or reception hall of a town house. Use only the perspective necessary to gain desired effect in stairway. If the plan permits, a sketch may be made on the floor of a simple oriental rug. Wrought iron is suggested for the stair banister.

2. The rest of the month of March is to be devoted to a construction problem. With adhesive tape fasten together on the short ends two pieces of illustrator's board about 15x20 inches. Construct furniture for a bedroom from Wedding Bristol Board. A bed

about seven inches long and the other furniture in proportion. Go over this furniture with opaque color and apply tiny designs in harmonizing colors. A bolster may be made by rolling a piece of water color paper and inserting and pasting tissue paper in each end. On the ends of tissue paper may be put a little lace pattern of white opaque color. Thin curtains for the windows may be made in the same way. This has been found to be an exceedingly interesting and profitable problem when pupils and teacher put into it their best efforts. It can be much elaborated upon.

#### April

1. Have all Costume Design work done on Wedding Bristol Board cut proper size to fit note books made in the fall. Set up straight front figure of girl of high school age. Make drawing about 8 inches high. Clothe figure in simple original spring dress. When painting use a wash with darker value of same color for folds.

2. Using "Art in Costume Design" by Edna Mann Shover, make a study of Historic Costume for the next two weeks. Have students write in their note books answers to all questions found at the end of chapters.

3. Design a street costume and an afternoon dress having students use their knowledge of historic ornament.

#### May

1. Spend two weeks in the study of Historic Ornament as applied to Architecture and Art History. Write themes in notebooks on the subjects at the end of the study periods. Two chapters which can be easily covered in this length of time will be found in "Art Education for High Schools," published by the Prang Co.

2. If the school is planning an "Operetta" or school play of any sort, a most interesting problem will be found in constructing a stage of a box about 21x28x9 inches. Scenery and a back drop to be painted by the best poster students, and the figures by those best in costume design. If the box is painted black on the outside it will set off the colors used.

3. Make posters advertising either your own or the grade schools closing exercises.

#### REFERENCE BOOKS, AUTHOR

#### PUBLISHER

Interior Decoration, Frank Alva Parsons; Doubleday, Page & Co.

The House in Good Taste, Elsie De Wolfe; Century Co.

The Tapestry Book, Helen Churchill Candee; Frederick A. Stokes Co.  
Tapestries, George Leland Hunter; John Lane Co.

Art in Costume Design, Edna Mann Shover; Milton Bradley Co.

How to be a Fashion Artist, Edith Young; Edith Young.

The Psychology of Dress, Frank Alva Parsons; Doubleday, Page & Co.

Costume Design Packet, Human Proportion Packet, Eudora Sellner;  
The Davis Press, Worcester, Massachusetts.

Art Simplified, Pedro J. Lemos, John T. Lemos; The Prang Co.

Principles of Advertising Arrangement, Frank Alva Parsons; The  
Prang Co.

Art in High Schools, The Prang Co.

Lettering, Thomas Wood Stevens, The Prang Co.

Appolo, S. Reinach, Charles Scribner's Sons.

#### MAGAZINES

#### PUBLISHER

The School Arts Magazine, The Davis Press, Worcester, Mass.

Le International Studio, John Lane Co.

House Beautiful, The House Beautiful Pub. Co.

The Vogue, The Vogue Co.

## GENERAL EQUIPMENT

Tube water colors ..... Primary and Binary colors

Opaque colors ..... Primary and Binary colors

Venus eraser, art gum and soft ink eraser

Brass edged ruler

Ball pointed and ruling pens

Number 16 water color brush

Two small brushes

White opaque color

Sponge

## BIBLE

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### I. Educational Standards.

1. The same scholastic preparation of teachers for these courses is required as is required of any teacher in the accredited high schools of the state.

2. The requirements for attendance, punctuality and examinations shall be the same as those for any course offered in an accredited South Dakota high school.

3. The number and length of recitation periods shall be the same as those required in any other high school subject of equal unit value.

4. All needed equipment such as rooms with proper heat, light and floor space, maps, charts and reference books shall be fully adequate for teaching the work offered.

### II. Elections in Bible Study.

1. In order to give freedom of choice to students of different faiths, and to satisfy the demands of various schools and colleges, the following three courses are recognized as suitable component parts of a college entrance unit. Any two of these courses shall be a minimum requirement. Each course shall require five forty-minute recitations per week for eighteen weeks.

### COURSE 1.

(One-half unit)

#### I. Narratives and Songs of the Old Testament.

1. The Creation Stories. Gen. 1 and 2, Psalm 5.
2. The Serpent in the Garden. Gen. 3.
3. Cain and Abel. Gen. 4: 1-16.
4. The Story of the Flood. Gen. 6: 1-9: 17.
5. Abraham the Pioneer. Gen. 12: 1-17:27.
6. The Doom of Sodom. Gen. 18: 1-19:29.
7. The Offering of Isaac. Gen. 22:1-19.
8. Finding a Wife for Isaac. Gen. 24.
9. Jacob's Deception. Gen. 25:27-34; 27:1-28:9.
10. The Deceiver Deceived. Gen. 29:1-30:43.
11. Jacob at the Jabbok. Gen. 31:1-32:32.
12. Joseph Sold by his Brothers. Gen. 40:1-41:57.
13. Joseph the Interpreter of Dreams. Gen. 40:1-41:57.
14. Joseph's Generosity to his Brothers. Gen. 42:1-44:34.
15. Joseph's Loyalty to his Family. Gen. 45-47.
16. Moses' Preparation for Leadership. Exodus 1-2.
17. Moses' Call to Deliver Israel. Exodus 3.
18. The Deliverance from Egypt. Exodus 11-12.
19. The Covenant at Sinai. Exodus 20.
20. The Report of the Hebrew Spies. Num. 13-14:25.
21. The Balaam Oracles. Num. 22:1-24:25.
22. Crossing the Jordan. Joshua 2, 3.
23. The Capture of Jericho. Joshua 6, 7.
24. Deborah's Battle Song. Judg. 4, 5. Judg. 6-8.
25. The Sword of Jehovah and of Gideon.
26. Sampson the Hero of a Barbarous Age. Judg. 13-16.
27. The Idyl of Ruth. Ruth.

28. Samuel's Boyhood Training. 1 Samuel 1-3.
29. Samuel's Discovery of a Leader. 1 Samuel 9, 10.
30. Saul's Election as King. 1 Samuel 11.
31. Jonathan's Achievement at Micmash. 1 Samuel 14.
32. David the Popular Hero. 1 Samuel 17, 18.
33. Jonathan the Loyal Friend. 1 Samuel 19, 20.
34. David the Outlaw. 1 Samuel 21-27.
35. Saul's Death and David's Lament. 1 Samuel 31, II Samuel.
36. Bringing the Ark to Jerusalem. II Samuel 6; Psalm 24.
37. A King's Treachery and Nathan's Parable. II Samuel 11; 12.
38. The Disloyal Son of a weak Father. II Samuel 13; 1-18:33.
39. A Popular Declaration of Independence. I Kings 12.
40. Elijah's Protest Against Baalism. I Kings 17; 1-19:18.
41. Elijah's Defense of Popular Rights (Naboth's Vineyard). I Kings 21.
42. The Elisha Stories. I Kings 19:19-21; II Kings 2-9; 13:14-21
43. The Young Prophet Isaiah. Isaiah 5, 6.
44. Jerusalem Delivered from Sennacherib. Isaiah 37; Psalm 46
45. The Faith of the Exiles. Psalms 42-43.
46. Daniel and his Three Friends. Daniel 1.
47. The Feast of Belshazzar. Daniel 5.
48. Daniel in the Lion's Den. Daniel 6.
49. A message of Comfort to the Discouraged Exiles. Isaiah 4.
50. A True Servant of Jehovah. Isaiah 42:1-6; 52; 13-52; 12.
51. Nehemiah the Builder. Neh. 1, 2; 4:33-5:19; 7:1-3 12; 31, 32, 37-40, 43.
52. A Narrow-minded Nationalist. Jonah 1:1-2; 1; 3, 4.
53. The Nature of Wisdom. Proverbs 8.
54. The Source of Wisdom. Job 28.
55. The Wonders of the Universe. Job. 38.
56. Youth and Old Age. Eccl. 11:9-12:8.
57. The Righteous Ruler. Psalm 72.
58. The Security of the One Who Trusts God. Psalm 91.
59. The Creator and Preserver of Man. Psalm 33.
60. God the Eternal. Psalm 90.

### Aims

1. In general to enable boys and girls to understand and assimilate the thought and to feel the beauty and the spiritual inspiration of those Old Testament masterpieces that appeal most strongly to their interests and needs.

2. To supply the geographical setting and the literary and cultural atmosphere required to understand what each narrative and song sets forth.

To retell or dramatize each narrative, to trace the development of the thought in each song and to help the students to formulate the principles of life which each narrative or song sets forth.

### Method

1. The Biblical text used may be either the Authorized Version, the American Revised, the Douay Version, the Holy Bible Translated from the Latin Vulgate, the New Translation of the Holy Scriptures issued by the Jewish Publication Society of America, or a standard modern translation, as for example, that of the Shorter Bible.

2. In narratives where two versions have been combined, it is desirable, for the sake of literary unity, to follow the older version, and therefore books giving only this simpler text is preferable as a basis for classroom work.

3. In general the same methods are to be employed in realizing

the aims of this course as are followed with students of the same age in the study of English Literature. The main emphasis is to be placed on the mastery of the contents and on intellectual and spiritual inspiration rather than on the minute analysis of the literary form of each narrative and song.

## **COURSE II.**

(One-Half Unit)

### **I. History of the Hebrew Commonwealth.**

#### **Contents**

The political, social and cultural development of the Hebrew people from the Egyptian bondage to the destruction of the Jewish state by Rome.

#### **Aims**

To give in form adapted to boys and girls a clear knowledge—

1. Of the physical and historical geography of Palestine and of the larger world in which the Hebrews lived and developed.
2. Of the leading races and of the intellectual and social forces with which they came in contact.
3. Of the important periods, characters and events in their history.
4. Of the ways in which their institutions, such as the family, the state, the Church and the school developed.
5. Of the gradual unfolding of those religious beliefs and democratic ideals that constitute the chief contributions of the Hebrews to the faith and civilization of mankind.

#### **Method**

1. Definite daily assignments in a text book carefully adapted to the interests and mental capacity of the young student and largely biographical in method, in which unimportant data will be omitted, and the leading characters and events of the history will be made vivid, each institution studied in the lights of its social setting.
2. Special assignments to the Biblical sources and to selected books of reference.
3. Frequent papers, classroom discussions and tests.
4. The newer methods and standards of work that are maintained in the corresponding courses in European and American history.

## **COURSE III**

(One-Half Unit.)

### **I. Life and Work of Jesus and Paul.**

#### **Contents**

The development of Christianity from the Reign of Augustus to the persecution of Domitian.

#### **Aims**

1. In general to give students such vivid impression of the work and personality of Jesus and his early followers that they spontaneously accept and apply his principles of living.
2. In detail to give a clear idea of the contents and nature of the records of the life work of Jesus and his early followers.
3. To study—
  - a. The geographical and historical setting of this work and the convictions and hopes in the minds of the people to whom they spoke.
  - b. Jesus' early home training and the home of John the Baptist.
  - c. The Purpose and plan of Jesus' public activity.
  - d. The conditions which confronted him in Galilee and

- Jerusalem. His methods, his dauntless enthusiasm and the result of his work.
- e. The events that led to his death and the facts underlying the Resurrection stories.
  - f. Jesus' chief teachings regarding the right relation between God and man, between man and his neighbor, each man's duty to society, the use of wealth and the essentials for true happiness.
  - g. The life of the early Christian Communities at Jerusalem and Antioch.
  - h. Paul's personality and early training.
  - i. His conversion and the successive stages in his work.
  - j. Paul's chief social teachings.
  - k. The hopes and experiences of Jesus' followers during the last half of the first Christian century.
  - l. The contributions of early Christianity to human thought and civilization.

### Methods

In general the same as in Course II.

As a guide in this course the following outline is suggested:

#### A—Jesus

1. Extent and Power of the Roman Empire in Jesus' Day.
2. Little Palestine, and its Sad History.
3. The Religious Convictions and hopes of Jesus' People.
4. Jesus' Early Home Training. Mk. 1-9; 6-3.
5. Boyhood Traits as Reflected Back from His Public Ministry. Mk. 6. 2-4; 10.7-9; 9.36; 10.13-16; Lk. 2.41-50; 15.1-2, 10.
6. The Influence of John the Baptist upon Jesus. Mk. 1.1-11. Lk. 7.18-28.
7. Jesus' Dedication to His Prophetic Work. Mk. 1.9-11. Lk. 4.1-13.
8. The Happy Beginnings of Jesus' Work. Mk. 1.14 Lk. 4.14a. Mk. 1.15. Lk 4.16-22a.
9. His Contagious Enthusiasm for His Work. Mk. 1.16-20, 21-22, 27a, 28, 35-39; 6.6b-11, 30-34, 45-46.
10. His care for the Needy. Mk. 1.23-26, 30-34, 40-45; 2.1-5, 11-12.
11. His Message of Joy and Helpfulness. Mk. 2.18-19, 21-22, 23-27, 3-1-4 Mt. 12. 11-12. Lk. 15.
12. His call for Men of Sterling Character. Lk. 6.12-13a. Mk. 3.14-19. Mk. 5.5. 7-12, 13-16, 20, 23, 27-28. Lk. 6 27-28, 31-36; 11.33-36; 14.25-35.
13. Jesus' Disgust with Mere Formalities in Religion. Mt. 5.20, 33-37; 6.1-4, 5-7, 16-18. Mk. 7.6-8. Mt. 15.13, 14a.
14. Discovering the Good in Other People. Lk. 6.37-38, 41-42, 39.
15. Absolute Sincerity in Religion. Mt. 7.15. Lk. 6.43-49; 11.37-44-48, 51b. 54. Mk. 12.38-40.
16. Jesus Clashes with the Teachers of His People. Lk. 11. 19-20. Mk. 7. 1-2, 5-9, 14-15. Mk. 3.23-30; 8.11-13, 15.
17. His family and friends turn against Him. Mk. 3.19-21, 31-35; 6.1-6. Mt. 10.34-39.
18. How Jesus Rose Above His Disappointments. Mk. 4.1-9. Mt. 13.44-45. Lk. 10.2-5, 11, 16, 21, 23-24.
19. His Optimism in Face of Great Odds. Mt. 13.24-30. Mk. 4.26-29, 30-32. Mt. 13.33.
20. Jesus Driven into Exile. Mk. 3, 6; 7.24, 31; 8.10-13, 27.

21. He Spurns Peter's Suggestion of Political Ambition. Mk. 8.27-30; 51, 33, 34-37; 9.1.
  22. A Prophet's Mission and a Prophet's Doom. Mk. 9.2-4, 7-8. Lk. 9.30-32. Mk. 9.30-31a. Lk. 12.49-51.
  23. Living for the Good of Others. Mk. 9.33-36. Mt. 18.4. Mk. 9.38-40. Lk. 11. 27-28. Lk. 17. 7-10. Mk. 10. 35-44, 18.
  24. The Fight for Nobility of Life Mk. 9.43-50. Lk. 10.31-42; 13.22-25.
  25. The Sacredness of a Child's Faith. Mk. 9.42. Mt. 18.10, 14. Mk. 10.13-16.
  26. The Spirit of Godlike Forgiveness. Mt. 18.15. Lk. 17.3-4; 9.51-56. Mt. 18.23-35 Mk. 11.25.
  27. Wholehearted Devotion to God. Lk. 9.57-62.
  28. How to Make Prayer a Vital Reality. Lk. 11.1-4; 18.9-14.
  29. God's Thorough Understanding of all Human Need. Lk. 11.5-13.
  30. Loyalty to Conviction. Lk. 12.4-7.
  31. The Dangers of Wealth. Lk. 12.13-21; 16.19-31. Mk. 10.17, 19-27.
  32. All Life Under the Sway of God. Lk. 12.35-40, 42-48; 16-10-13; 17.20-21. Mk. 13.28-32a, 35-36.
  33. The Divine Love for the Wayward. Lk. 7.36-50. Mt. 11.28-30. Jno. 7.53-8. 11. Mt. 21.28-32. Lk. 15.
  34. Jesus' Appreciation of the Religion of Non-Jews Lk. 10. 30-37; 7.1-9.
  35. His Sorrow over the Hardened Spirit of the Jewish Teachers. Lk. 14. 15-24. Mk. 10. 32 Lk. 19.41-44. Mt. 21. 10, 11 Mk. 11. 11, 15-19.
  36. Jesus' Fight to Protect the Home. Mk. 10. 2-12.
  37. Jesus' Definition of "Salvation" and "Real Religion," Mk. 10. 17, 19-27. Lk. 19.11-10. Mk. 12.28-34.
  38. Jesus Sees the Hopelessness of His Nation under their present Leadership. Mk. 12. 1-5, 9, 12. Mt. 22. 1-10. Mk. 13.1-2.
  39. The Heroic Death of Jesus. Mk. 14.32-42, 43-49a, 50, 53-61a, 15. 1-5, 15-20, 21-32, 33, 37, 39-41.
  40. The New Life Which Jesus Imparted to His followers. Lk. 24.13-35. Jno. 1.4, 5, 16-18; 3. 16; 8.12; 10.10-11, 16; 12.24-25, 32; 13.34-35; Chap. 21.
- B—Paul
1. Saul—Paul and his Early Life in Tarsus.
  2. His Career as a Rabbinical Student and Persecutor of Heretics.
  3. How Paul was won by Jesus. Gal. 1.10, 15, 16; 2.7, 19, 20; 4.6, 7; 5.14; 5.22-24; 6.15, 16. Acts 9.3-19a.
  4. His first work as a Disciple of Jesus. Acts 9. 19b-31.
  5. His broader work at Antioch and Galatia. Acts 13.1-4. 28.
  6. How Christianity became a World Religion. Gal. 2.1-10, 11-14. Acts 15. 1-35. Gal. 2. 15-21; 5. 1-6-10.
  7. The First Christian Churches in Europe. Acts 15. 36-19. 1.
  8. to 10. Paul's Work for the Corinthian and Ephesian Churches. Acts 19. 1-21:14. I and II Corinthians.
  11. and 12. His Anticipations of Work in Western Europe. Romans.
  13. His Disappointing Imprisonment at Jerusalem and Caesarea. Acts 21. 15-26.
  14. To Rome as a Prisoner. Acts 27. 1-28:16.
  15. His last work in the Roman Prison. Acts 28. 17-31, Philemon. Clossians. Philippians.

Note: As a desirable preparation for later Bible work it is recommended that students between the ages of nine and thirteen,

either in the home or the school, be directed and encouraged to commit to memory the following Biblical passages:

### Old Testament

1. The Ten Commandments. Exodus 20. 1-17.
2. The two Great Commandments. Deut. 6:4, 5 and Lev. 19:18b
3. Ten Great Proverbs. (1) Prov. 16:3; (2) 29:11; (3) 16:32; (4) 16:8; (5) 15:7; (6) 15:1; (7) 16:18; (8) 26:27; (9) 11:25; (10) 14:34.
4. True Religion. Micah 6:8; Isaiah 58:5-9b.
5. The Two Ways of Thinking. Psalm 1.
6. The Psalmist's Decalogue. Psalm 15.
7. The Psalm of Trust. Psalm 23.
8. God's Message through His Works and Word, Psalm 19.
9. The Goodness of God. Psalm 103.
10. God's Rule on Earth. Isaiah 2:1-4.

### New Testament

1. The First Christmas. Luke 2:8-18.
2. Jesus' Love for Children. Matt. 19:13, 14.
3. A Universal Prayer. Matt. 6:9-13.
4. Golden Rule. Matt. 7-12.
5. The Beatitudes. Matt. 5:3-12.
6. Ten Sayings of the Great Teacher. (1) Matt. 7:7-8; (2) Matt. 7:1; (3) Luke 12:48b; (4) Matt. 6:1, 3; (5) Luke 6:38; (6) Mark 10:43b, 44; (7) Matt. 7:16, 17; (8) Matt. 6:21; (9) Matt. 5:44, 45; (10) John 15:13.
7. The Parable of the Good Samaritan. Luke 10:30-37.
8. Right Thinking. Phil. 4:8.
9. Paul's Song of Love. I Cor. 13.
10. The Value of the Bible. II Timothy 3:16, 17.

## COMMERCIAL

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### I. Suggested Course of Study for Commercial Students:

First Year.	Second Year
English I.	English II.
Elementary Algebra	Plane Geometry
Elective	Bookkeeping
Elective	Elective
Third Year.	Fourth Year
English III.	English IV.
Year of Science	American History and Civics
Com. Arithmetic and Geography	Typewriting
Com. Law and Salesmanship	Shorthand

### II. Explanatory:

1. In this course, the bookkeeping, typewriting and shorthand work is to be done in five eighty-minute periods (in the clear) per week throughout the year.

2. Schools desiring to extend the work in typewriting and shorthand over two year periods may do so by offering bookkeeping in the first year of the course, commercial arithmetic and geography in the second year, and typewriting and shorthand as half unit courses each in the third and the fourth years. If this is done the courses in commercial law and salesmanship should be offered in the fourth year, allowing an elective in the third year.

3. Since four units of work in English are required of all students for graduation from high school, Business English is not offered in the foregoing outline. Schools desiring to offer a unit's work in Business English in addition to the English Course outlined elsewhere in the Manual may do so as an elective in the second year. If this is not done, Business English shall be emphasized throughout the four years of required English so that the students upon graduation, shall have acquired the necessary training which mastery of this subject gives.

### Double Entry Bookkeeping (One Unit)

#### I. First Six Weeks:

1. Fundamental Principles and Bookkeeping Terms.  
Debiting and Crediting, Journalizing, Posting, Trial Balance, Statements, Opening and Closing Accounts in the Ledger, Notes Receivable, Notes Payable, Inventory, Business Transactions, Merchandise, Cash, Expense, Etc.
2. Classification of Accounts.
  - a. Real accounts.
    1. Assets—Cash, notes receivable, accounts receivable, inventories, real estate, buildings, fixtures, office furniture, and delivery equipment.
    2. Liabilities—Notes payable, accounts payable.
    3. Proprietary Interest Accounts—Proprietor investment, proprietor drawing and profit and loss.
  - b. Nominal Accounts.
    1. Income Accounts—Merchandise sales, interest earned, merchandise discount on purchase.
    2. Expense Accounts—Merchandise purchases, salaries, freight and cartage out, delivery expense, insurance,

office supplies, sundry general expense, interest paid, merchandise discount on sales, collection and exchange.

3. Books of Original Entry—Journal, Cash Book, Sales Book, Purchase Book.
  3. Books of Classified Accounts—Ledger.
  4. Auxillary Books—Check stubs, note stubs, draft stubs, receipt stubs, and bank pass book.
  5. Business Papers—Bills or invoices, receipts, checks, notes, statements.
  6. Supplementary Exercises in Text.
- II. Second Six Weeks.
1. Review Fundamental Principles.
  2. Business Papers—Invoice, check and note.
  3. Introduction of the Cash Book.
  4. Blank Set with Text used covering above material.
  5. Supplementary Exercises in Text.
- III. Third Six Weeks.
1. Introduction of Purchase Book and Sales Book
  2. Bank Account—Bank, deposit, checks, pass book, bank statement, receipt, invoice, and promissory note.
  3. Checking Errors in Trial Balance.
  4. Blank Set with Text used covering above material.
  5. Supplementary Exercises in Text.
- IV. Fourth Six Weeks.
1. Partnership—Articles of Copartnership.
  2. Introduction of the Three Column Cash Book.
  3. Blank Set with Text used covering above material
  4. Supplementary Exercises in Text.
- V. Fifth Six Weeks.
1. Introduce Journal Method of Closing.
  2. Business Papers—draft, bill of lading, monthly statement of accounts, orders, telegrams.
  3. Blank Set with Text used covering above material.
  4. Supplementary work in Text.
- VI. Sixth Six Weeks.
1. Finish blank sets.
  2. Supplementary Exercises in Text.
  3. Review.

## COMMERCIAL ARITHMETIC

(One-half Unit)

- I. Aim:
  1. Absolute accuracy and as much speed as the pupils are capable of developing in the time allowed for this subject in computation demanded in general by the business world.
  2. A working knowledge of commercial forms and commercial processes in general use in the business world.
- II. Suggestions as to the Course:
  1. While a text book is essential in this course, the teaching must omit from the course such content of the text as is not essential in realizing the aims of the course.
  2. The work done in commercial arithmetic should be closely related to business procedure of the community so that the students may realize that what they are doing in this course is what the business world demands.
  3. The instructor must realize that this is not essentially a review of work done in the grades, but that the art of general computation is what is being taught.

4. All so-called short cuts which may be of special value in any given business, but which have no application in the general business world are to be omitted.
5. Credit for work done in this course shall depend on progress made in developing habits of accuracy and speed and computation, and shall be denied if such development has not resulted.

### COMMERCIAL GEOGRAPHY

(One-half Unit.)

#### I. Aims:

1. The student completing this course should know.
  - a. The natural resources of the world, and especially those of his own nation.
  - b. The commercial interests and activities of the nations of the world, and especially those of the United States.
  - c. The effect which these natural resources and commercial activities have had upon his own life, and the opportunities for future accomplishment which they offer him.

#### II. Suggestions as to the Course:

1. Commercial geography to be worth while, should be approached and pursued from the standpoint of cause and effect rather than from the standpoint of the much used fact-memory method.
2. The pupil should study the effect of latitude and terrestrial wind systems, and topography until, given the location and topography of a country, he is able to determine her natural resources in so far as they are determined by these factors.
3. Other determining factors of natural resources should be studied with the same end in view.
4. The pupil should relate the natural resources of a nation to its commercial interests and activities as to cause and effect.
5. He should relate both the natural resources and the commercial interests and activities of this nation to his own life.
6. The students will be interested in materials which can be secured from state immigration departments and chambers of commerce showing the natural resources and commercial activities of all parts of the United States and they should secure this material through their own correspondence.
7. The students should become familiar with the Consular Service through their research work in connection with the commercial geography of foreign nations. (Secure the last Consular Report from Washington, D. C.).

### COMMERCIAL LAW

(One-half Unit.)

#### I. Aims:

1. The student shall know the conditions and limitations of business.
2. Their personal rights and responsibilities in the business world.
3. How to avoid litigation by observing the laws governing business transactions

#### II. Suggestions as to the Course:

1. Emphasize:
  - a. The nature and essentials of the contract.
  - b. The nature of property and property rights.
  - c. Bailments.
  - d. Negotiable instruments.

- e. Partnerships and corporations.
  - f. Agency.
  - g. Insurance.
  - h. Real property and titles, including deeds, mortgages and liens.
2. In this, as in similar commercial courses, there should be no attempt at specialization. Only matters pertaining to the general business world should be included in this work.

### SALESMANSHIP

- I. Aims: Salesmanship should be studied that the student may—
- 1. Know the problems and methods of salesmanship that the fullest cooperation may exist between him in his work in the business office and the sales force of his employer.
  - 2. Have a preliminary training which shall arouse interest in the production phase of business to the end that the student may finally enter the sales force and increase his own earning power, should he so desire.
- II. Suggestions as to the Course:
- 1. Advertising.
    - a. Importance to business and to the purchaser.
    - b. Methods of advertising and relative value of each.
    - c. Psychology of suggestion in advertising.
    - d. Advertising in closing the sale.
  - 2. Selling.
    - a. Importance of study of the line.
    - b. Importance of studying the prospective customer and his needs.
    - c. The negative approach in selling.
    - d. The positive approach in selling.
      - 1. Curiosity.
      - 2. The need, the desire.
      - 3. Closing the sale.
    - e. Methods and value of displaying the line.
  - 3. This course offers a large field for practice by the students in actually doing the things about which they are studying. They should have charge of the advertising of all school activities such as games, entertainments, carnivals, bazaars and other sales put on by the school. Business men will be interested in their advertising work and will furnish them with opportunity to do real work in advertising if properly approached in the matter. These same sources will give the students an opportunity to practice salesmanship also. A sales room in connection with schools giving vocational work is an easy possibility in the schools of the state. This room will allow the class to practice in displaying and selling goods made by the students of vocational courses and will do much to secure the enthusiastic support of the community in the school and its activities.

### TYPEWRITING

(One Unit)

- I. Aim: To secure credit for this course the pupil shall write forty words per minute for ten minutes without more than five errors.
- II. Suggestions as to the Course:
- 1. Grading Papers: Daily work is all checked for any errors, erasures, or overstrikes. Papers must be rewritten when they show erasures or overstrikes and when they are not written as assigned. While speed tests are not to be empha-

sized till the second half of the work, the following standards of grading shall be followed in the first semester. Twenty-five words per minute for ten minutes using new material secures a hundred per cent grade. Fifteen words per minute for ten minutes using new material secures the minimum passing grade of seventy five per cent. Above the minimum passing rate add two and one-half per cent for each word written per minute for ten minutes using new material.

#### First Semester (or Year).

2. Technique.
  - a. Sitting Position—height of table, twenty-five or twenty-nine inches, shoulders erect, directly in front of machine, wrists level, elbows straight with shoulders, hands easy slant from keyboard, fingers must be curved, strike with tip of finger, wrist level, quick, firm touch with fingers.
  - b. Third finger drilling.
  - c. Fingers over guide keys.
  - d. Little fingers on anchor keys.
  - e. Bring fingers back to guide keys.
  - f. Space bar—May be struck different ways. Best first one thumb and then the other.
  - g. Proper way to return carriage—Left hand shift return with hand, right hand shift with thumb.
3. Touch Mastery of Keyboard.
4. Working knowledge and Features of Machine—Inserting and removing the paper, spacing and beginning a new line, releasing the carriage, operating space bar, inspecting the writing, adjustment of the paper, the scales, the printing point, the back spacer, line space gauge, cleaning type and machine, the paper guides, the marginal stops, the marginal release, regulating carriage tension, the envelope holder, the paper side guide, line spacer, tabulator, shift key, ribbon movement, changing ribbons, oiling machine.
5. Work for steady development of speed with increased accuracy.
6. Practise exercises for finger action, perfection technique, and increasing speed.
7. Special emphasis on use of figures and signs.
8. Write words of high frequency.
9. Write words of different combination.
10. Write finger twister alphabetical sentences, etc.
11. Study of correct letter forms, telegrams, cablegrams, and details of business correspondence.

#### Second Semester (or Year).

- I. Grading: The minimum rate for a unit of credit for typewriting shall be thirty words per minute of new material for ten minutes, which secures a grade of seventy five per cent. Add two and one-half per cent for each word the rate is increased. A rate of forty or above secures a one hundred per cent grade.
- II. Suggestions as to course:
  1. Work for high speed and 100 per cent accuracy.
  2. Speed and accuracy tests from one to ten minutes on new and practical material.
  3. Present day business and office methods.
  4. Spelling tests on machine.
  5. Preparation of constitutions and by-laws.
  6. Convention and club programs.
  7. Difficult tabulation.

8. Billing, bank statements, report, railroad and other financial statements.
9. Legal forms.
10. Stencil cutting.
11. Direct dictation.

### SHORTHAND

(One Unit)

- I. Aim: To secure one unit of credit in shorthand, the student shall be able to take one hundred letters dictated at from eighty to one hundred words per minute with ninety five per cent accuracy, and pass a test of five hundred words dictated at the rate of one hundred words a minute with not more than twenty five errors.
- II. Suggestions as to Course:
  1. Follow the manual adopted by the Board of Education.
  2. At the request of practically all the commercial teachers in the state, the following outline of the Gregg System of shorthand is herein inserted. This is in no sense an adoption or a recommendation for adoption of this system for the state.

#### Gregg System of Shorthand.

- I. Text—Gregg's Shorthand Manual. Supplementary texts—Gregg's Speed Studies, Gregg Writer, Beginners Letter Drills, Gregg's Supplementary Exercises, and Gregg's Progressive Exercises. Also Constructive Dictation, by E. H. Gardner.
- II. First Semester.
  1. Principles and rules of shorthand.
    - a. Rules for joining circles.
    - b. Rules for circles taking the form of a loop.
    - c. Location of word on line.
    - d. Rule for the O hook.
    - e. Rule for the OO hook.
    - f. Rules for W and Y.
    - g. Rules for joining S with Th.
    - h. Rules for expressing R.
  2. Word signs and simple phrasing.
  3. Diphthongs.
  4. Blended Consonants.
  5. Compound words and abbreviations.
  6. Read all the sentences in the first ten lessons of the Manual and Gregg Writer.
  7. Vocabulary Drills.
  8. Dictation of simple sentences from Gregg's Supplementary Exercises, Gregg's Progressive Exercises and the Gregg Writer.
  9. Complete first ten lessons of Manual.
- III. Second Semester.
  1. Drill on phrase writing from manual, Speed Studies and Gregg Writer.
  2. Rules for the omission of vowels.
  3. Master prefixes and suffixes, joined prefixes, compound joined prefixes, tr principle, disjoined prefixes, compound disjoined prefixes, joined suffixes, disjoined suffixes.
  4. Advanced phrase writing.
  5. States and territories.
  6. Principal cities.
  7. Points of compass.
  8. Vocabulary drills.
  9. Review word signs.
  10. Finish Speed Studies.
  11. Drill in dictation until aim of course is accomplished.
  12. Test as described in the statement of the Aim in shorthand.

## ENGLISH

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### FOUR YEAR COURSE

No attempt is made in this syllabus to give an exhaustive treatment of the study of English. The aim is to give to all schools working under widely varying conditions, the same working basis. Each school is free to work out the details of the course according to the methods best adapted to the particular school.

The English includes the study of composition, grammar, rhetoric, literature and oral expression. The study of literature, composition and oral expression should be emphasized each year of the course.

Four units of English credit are required of all students for graduation.

### COMPOSITION

The study of composition as a whole should be given very careful attention. After the completion of the composition course, the pupil should be able to produce a theme correct as to formal detail, spelling, grammar, punctuation, and written in a neat, legible handwriting. Forming right habits should be the primary aim the first two years. Nothing can accomplish this but thorough drill, consistently and persistently carried on. The study during the third and fourth years should strengthen habit and become the basis for more advanced thinking and more finished expression.

Expression in writing includes:\*

1. Ability to write a courteous letter according to forms in general use, and of the degree of formality or informality appropriate to the occasion.
2. Ability to compose on first draft a clear and readable paragraph or series of paragraphs on familiar subject matter with due observance to unity and order, and with some specific detail.
3. Ability, with due time for study and preparation, to plan and work out a clear, well ordered, and interesting report of some length upon one's special interests—literary, scientific, commercial, etc.

\*Report of the Commission of National Joint Committee on Reorganization of English.

There are three clearly defined methods of teaching composition:

First—that which depends upon good models and the pupil's faculty of imitation—a method which lays stress on reading in the teaching of composition.

Second—that which permits the pupil to write in his own way of his own experiences, and then points out his errors and leads him to discover and apply the principles of writing—a method that emphasizes the development of the pupil's personality.

Third—that which frankly presents the principles and rules and requires the pupil to apply them in his writing. These may be termed the imitative, inductive and deductive methods. One method may be best for one pupil, another for another, or all may be effective at different stages of the pupil's development. The teacher should employ any means that will serve best the needs of the individual pupil.

### ORAL COMPOSITION

Since oral expression is used more than written expression, the value cannot be over-emphasized. Expression in speech includes:\*

\* New York State Syllabus.

1. Ability to read ordinary prose and poetry aloud intelligently and expressively.
2. Ability to answer clearly, briefly and exactly a question on which one has necessary information.
3. Ability to collect and organize material for oral discussion.
4. Ability to join in a conversation or an informal discussion contributing one's share of information or opinion, without wandering from the point and without discourtesy to others.

Every English recitation should aim to improve the speech of the pupil. Each department in high school should co-operate with the English department by insisting upon good oral work in recitations. Success in overcoming bad habits of speech and acquiring good ones, requires absolute uniformity in the enforcement of standards by all teachers in the school.

### LITERATURE

There are at least three reasons for teaching literature:

First—to teach a love for reading;

Second—to deepen and enrich the life of the pupil through his power to read with appreciation;

Third—to stimulate the pupil's power of self-expression.

Everything possible should be done to create a love for reading where the tendency is lacking. On the other hand the indiscriminate reader should be guided in order to cultivate a taste for good reading. Very little, if any, intensive and critical study should be done the first two years. Such work should be left for the junior and senior years. Extensive reading and class-room discussions, if skillfully handled, will create and stimulate a taste for good literature.

### REQUIRED OUTSIDE READING AND REPORTS

Before a pupil may receive credit for any year's work offered in this outline he shall have read and reported, either orally from an outline or with a written report, the content of enough books selected from the READING LIST of that year's work to total twenty points. Each book in the several lists has been assigned a value. If a freshman should read and report during the first semester, the first four books in the list for the ninth grade he would thereby earn eleven points, thus completing his semester's outside reading. The instructor should insist that each semester's work in outside reading and reports be completed early in the semester. The purpose of this work is to develop reading habit, and an appreciation of literature. The former aim must be realized first, and to this end the pupil should be allowed to select from these lists whatever interests him.

### ENGLISH—FIRST YEAR

(One unit)

#### FIRST SEMESTER:

The work of the semester is divided thus: composition, word study, grammar and literature with the greatest stress upon composition and grammar.

**Composition**—The aim in teaching composition in the first year is to teach accuracy. Short themes, both oral and written, based primarily upon the child's experience should be required every day during the weeks devoted to composition. Emphasis should be placed upon sentence and paragraph unity, coherence and clearness. Devote the semester's work to narration with some emphasis upon descrip-

tion. Give special attention to spelling, capitalization, punctuation and penmanship. No paper deficient in penmanship and spelling should be accepted, no matter how proficient in other details.

**Oral Expression**—Definite time should be given to oral work which should be planned as carefully as the written composition. Short talks to the class on subjects interesting to the class should be given frequently. Devote some time to current events and memorizing selections from poetry and prose.

**Word Study**—A good text on word study should be in the hands of each pupil. Drill in the use of the dictionary should be given early in the course. The pupil should be able to find a word quickly, understand the signs of syllabification, accent, pronunciation and derivation. Lack of facility in expression is not due to lack of ideas, but to the lack of means to express ideas.

**Grammar**—The purpose of the study of grammar is to develop "sentence sense" and to give the pupil a working use of grammatical principles that will enable him to correct his own mistakes and lay the foundations of correct speech. Therefore, the work in grammar should include the analysis of sentences, consisting in drill in syntax of words, phrases and clauses. Avoid intricate constructions which are beyond the mental ability of the class. Do not indulge in routine parsing. To give the pupil knowledge of grammatical principles, drill to overcome errors in the following—

1. Agreement between subject and verb.
2. Agreement of pronoun with antecedent.
3. Confusion of tenses, especially of the present tense with the past tense or the past tense with the present participle.
4. Confusion of verbs.
5. Use of double negatives.
6. Confusion of adjectives and adverbs.
7. Use of wrong case.

**Literature**—The purpose of the study of literature in the first year is to create a love of reading. Read for the joy of reading. Do not kill the interest in a good book by intricate study or by dwelling too long upon the book. Two classics are recommended for class study each semester. They should consist mainly of narration. The following classics are suggested for class study for the first semester. Choose one narrative poem, and one novel.

The Ancient Mariner, Coleridge

The Lady of the Lake, Scott

Snowbound, Whittier

Selections from American poetry. (About sixty pages from any standard collection.)

Old English Ballads. (Any standard collection.)

The Last of the Mohicans, Cooper

Selections from the Odyssey

Treasure Island, Stevenson

Stories of the Day's Work, Selected Modern Readings; Davis & Getchel

## SECOND SEMESTER:

**Composition**—Continue the work in theme writing, occasionally requiring a theme of greater length. Require outlines for each composition. Much drill should be given letter writing, both the business and friendly letter. Stress the substance of the letter as well as correct form.

**Word Study**—Continue the work of the first semester. Give special attention to synonyms. At the end of this semester the pupil

should be reasonably accurate in spelling and pronunciation, and should have increased his vocabulary considerably.

**Grammar**—The grammar drill during this semester should consist of sentence analysis and drill on the "minimum essentials." Only those parts of grammar should be taught which can be made useful to the child in his writing and speaking.

**Literature**—During this semester study one drama and one other selection. Encourage much outside reading. It is not essential that a pupil give a long and technical report on his reading during the first year. The following are suggested for class study:

Old Testament Stories  
 Tales of a Wayside Inn, Langfellow.  
 Boy's King Arthur, Lanier.  
 The Jungle Book, Kipling.  
 As You Like It, Shakespeare.

#### First Year Reading List:

- 2 Alcott, L. M., Eight Cousins; Little, Brown Co.
- 2 Alcott, L. M., Joe's Boys; Little Brown Co.
- 2 Alcott, L. M., Little Women; Little, Brown Co.
- 2 Aldrich, Story of a Bad Boy; Houghton-Mifflin.
- 2 Allen, Flute and Violin; Harper.
- 2 Bacheller, Dri and I; Grosset.
- 3 Barrie, Little Minister, Crowell, Boston.
- 3 Barrie, Peter and Wendy, Scribners.
- 2 Bishop, Bob Thorpe-Sky Fighter.
- 2 Catherwood, Story of Tonty; McClurg, Chicago.
- 3 Clemens, Prince and the Pauper, Harper, New York.
- 3 Connor, Glengarry School Days, Revell, Chicago.
- 2 Cooper, Last of the Mohicans; Dutton, New York.
- 3 Cooper, Deerslayer; Dutton, New York.
- 2 Davis, Victor of Salamis; Grosset, New York.
- 2 Dickens, Christmas Stories; Dutton, New York.
- 3 Dickens, Oliver Twist; Dutton, New York.
- 2 Doyle, Adventures of Sherlock Holmes; Harper, New York.
- 2 Dodge, Hans Brinker; Grosset, New York.
- 2 Eggleston, Hoosier Schoolmaster; Grosset, New York
- 2 Ewing, Flatiron for a Farthing; Burt.
- 2 Ewing, Jan of the Windmill; Burt.
- 2 Field, Eugene; Christmas Tales and Christmas Verse.
- 3 Fox, Little Shepherd of Kingdom Come; Scribner, New York.
- 2 Gates, Biography of a Prairie Girl; Century, New York.
- 2 Griswold, Latta, Deering of the Deal; MacMillan.
- 3 Goss, W. L., Life of Grant for Boys; Crowell, New York.
- 3 Hawkins, Prisoner of Zenda; Holt.
- 2 Hasbrouck, L. S., Boy's Parkman; Little, Brown Co.
- 2 Hawthorne, Grandfather's Chair; Houghton-Mifflin.
- 2 Hough, Story of a Cowboy; Appleton.
- 3 Hughes, Tom Brown's School days; Harper, New York.
- 3 Irving, Tales of a Traveler; Houghton-Mifflin.
- 4 Jackson, Ramona; Little, Brown Co.
- 2 Lang, Andrew, Story of Joan of Arc.
- 2 Lucas, E. V., Slow Coach.
- 2 Lee, M. C., Quaker Girl of Nantucket; Houghton-Mifflin.
- 2 Moore, N. H., Deeds of Daring Done by Girls.
- 2 Martin, Emmy Lou; Doubleday, New York.
- 2 Muir, Stickeen; Houghton-Mifflin.
- 3 Nicolay, Helen, Boy's Life of Abraham Lincoln; Century, N. Y.
- 1 Richards, L. E., Captain January.
- 3 Rihbany, Hidden Treasure of Rasmola.

- 2 Seton, Biography of a Grizzly; Doubleday, New York.
- 2 Seton, Two Little Savages; Doubleday, New York.
- 2 Smith, Caleb West; Houghton-Mifflin.
- 2 Stoddard, Dab Kinzer; Scribners.
- 3 Spyri, Johanna, Heidi; Ginn & Co.
- 3 Stevenson, Black Arrow; Scribner.
- 3 Stevenson, Kidnapped; Scribner.
- 3 Trowbridge, Cudjo's Cave; Lothrop.
- 2 Trowbridge, Tinkham Brother's Tide Mill; Lothrop.
- 3 Tarbell, He Knew Lincoln; MacMillan Co.
- 3 Tarkington, Gentleman from Indiana; Doubleday Co.
- 3 Van Dyke, The Blue Flower; Scribner.
- 3 Verne, Around the World in Eighty Days; Dutton.
- 3 White, Blazed Trail; Doubleday.

#### Non-Fiction:

- 5 Antin, Promised Land; Houghton-Mifflin.
- 2 Bishop, The Story of the Submarine.
- 3 Bolton, Sarah, Lives of Girls who Became Famous; Crowell.
- 4 Bond, Inventions of the Great War.
- 3 Fabre, Secret of Everyday Things.
- 5 Hadgdorn, Life of Roosevelt; Harper.
- 3 Holland, Historic Boyhoods.
- 3 Holland, Historic Girlhoods.
- 3 Lummis, Some Strange Corners of our Country; Century.
- 4 Roberts, Kindred of the Wild; Page, Boston.
- 4 Roberts, Watchers of the Trails; Page, Boston.
- 3 Roosevelt, Letters of His Children; Scribners.
- 3 Stockton, F. R., Buccaneers and Pirates of Our Coast; Grosset.
- 3 Stuck, Hudson, Ten Thousand Miles with a Dog Sled.
- 4 Wallace, Lure of the Labrador Wild; Revell, Chicago.

### ENGLISH—SECOND YEAR

(One Unit)

#### FIRST SEMESTER.

**Composition**—The theme writing of this semester should be based on description, narration and exposition. Emphasis should be placed upon clearness through connectives, the direct placing of modifiers and direct reference. Review punctuation.

**Oral English**—Definite drill in oral work in the form of reports which call for organization on the part of the pupil should be required each week. The subjects should be of special interest to the pupil. Outlines should be prepared for each report. Study and memorize Lincoln's Gettysburg Speech.

**Literature**—Three classics should be studied this semester. The following are suggested:

- The House of Seven Gables, Hawthorn.
- The Sketch Book, Irving.
- Autobiography, Franklin.
- The Blue Bird, Van Dyke.
- Lorna Doon, Blackmore.
- Silas Marner, Eliot.
- The Making of an American, Rues.

#### SECOND SEMESTER.

**Composition**—Continue the writing of themes as during the first semester with special attention to exposition and letter writing. Make a study of the newspaper. Require editorials and news items of local interest. Work along this line can be stimulated by working with the school paper or the local papers. Give careful study to figures of speech.

**Oral English**—Continue the work of the first semester, placing emphasis upon current events.

**Literature**—Three of the following are suggested for class study:

An Inland Voyage and Travels with a Donkey, Stevenson.

Henry V., Shakespeare.

The Merchant of Venice, Shakespeare.

The Piper, Peabody.

Twelfth Night, Shakespeare.

Up From Slavery, B. T. Washington.

Selections from Modern Poetry.

Types of Short Stories.

### READING LIST—SECOND YEAR

#### Fiction.

Value. Author. Title. Publisher.

- 2 Allen, Kentucky Cardinal; Macmillan Co.
- 3 Atherton, The Conqueror; Harper.
- 3 Bacheller, Eben Holden; Lothrop.
- 3 Bacheller, The Light in the Clearing; Lothrop.
- 3 Churchill, The Crisis; MacMillan Co.
- 3 Churchill, Richard Carvel; Macmillan Co.
- 3 Churchill, The Crossing; Macmillan Co.
- 2 Connor, Black Rock; Revell.
- 2 Connor, Man from Glengarry; Revell.
- 2 Deland, Dr. Lavender's People; Harper.
- 2 Doyle, White Company; Grosset.
- 2 Duncan, Dr., Luke of the Labrador; Revell.
- 3 Ebers, George, Egyptian Princess; McClurgs.
- 2 Fox, Trail of the Lonesome Pine; Scribners.
- 2 Gras, Felix, Reds of the Midi; Appleton.
- 3 Henry, O., Four Million; Doubleday.
- 3 Johnston, To Have and To Hold; Houghton-Mifflin.
- 2 Liljencrantz, Thrall of Lief the Lucky; McClurg.
- 4 Mitchell, Adventures of Hugh Wynne; Century.
- 3 Norris, Frank, Pit; Doubleday.
- 3 Tarkington, Magnificent Amberons; Doubleday.
- 3 Tarkington, Monsieur Beaucaire; Doubleday.
- 3 Verne, 20,000 Leagues Under the Sea; Henry Coates.
- 2 Webster, Daddy Long Legs; Century.
- 3 Johnston, To Have and To Hold; Houghton-Mifflin.
- 3 Wister, The Virginian; Macmillan Co.

#### Non-Fiction:

- 3 Burroughs, Camping and Tramping with Roosevelt; Houghton-Mifflin Co.
- 3 Brooks, J. G., American Citizen; Houghton-Mifflin Co.
- 3 Franck, H. A., A Vagabond Journey Around the World; Century.
- 3 Grayson, Adventures in Contentment; Doubleday.
- 3 Grayson, Adventures in Friendship; Doubleday.
- 2 Grenfell, Adrift on an Ice Pan; Houghton-Mifflin Co.
- 3 Keller, Helen, Out of the Dark; Doubleday.
- 3 Maeterlinck, Life of the Bee; Dood, New York.
- 3 Muir, John, Story of My Boyhood and Youth; Houghton.
- 3 Ritter, G. H., Impressions of Japan.
- 4 Roosevelt, Hunting Trips of a Ranchman.
- 4 Roosevelt, African Game Trails; Scribners.
- 3 Smith, White Umbrella in Mexico; Houghton.
- 3 Stern, My Mother and I.
- 3 Washington, B. T., Up From Slavery; Doubleday.

**ENGLISH—THIRD YEAR**

(One Unit)

**FIRST SEMESTER.**

**Composition**—The composition work done in the third year should show a distinct advance over that of the preceding year. Study exposition this semester as a preparation for the study of argumentation in the second semester. Stress unity, coherence and emphasis in the paragraph, choice of words with attention to barbarisms, colloquialisms, provincialisms, slang, solecisms.

**Oral English**—During this semester place emphasis upon oral expression. Strive for distinctness, correct pronunciation, clear enunciation and well modulated tones.

**Literature**—American Literature. Three periods a week. The study of the history of literature should be a study of the principal movements and tendencies. There are several compilations of American poetry and it is advisable that some such compilations be in the hands of each pupil. In so far as practical, the pupil should read from each author, not merely about him. Some suitable text book, not a college text, should be used. At the end of the semester the pupil should have read something of Irving, Bryant, Cooper, Hawthorne, Emerson, Longfellow, Poe, Holmes, Thoreau, Lanier, Webster, Parkman and Whitman.

**SECOND SEMESTER.**

**Composition**—Study argumentation and brief making.

**Oral English**—Much of the time devoted to oral expression may well be devoted to current events through some good periodical.

**Literature**—Three of the following classics are suggested for class study:

Idylls of the King, Tennyson.  
 She Stoops to Conquer, Goldsmith.  
 Julius Caesar, Shakespeare.  
 The Tempest, Shakespeare.  
 Selections from Burns.  
 A Tale of Two Cities, Dickens.  
 Modern Poetry—English and American.  
 Pride and Prejudice, Jane Austen.  
 Prue and I, Curtis.

**THIRD YEAR READING LIST****Fiction.**

Value. Author. Title. Publisher.

- 2 Aldrich, Majorie Daw; Houghton-Mifflin.
- 3 Auerbach, On the Heights.
- 4 Austen, Pride and Prejudice, Dutton.
- 3 Bacheller, Man for the Ages.
- 4 Bronte, Jane Eyre; Burt.
- 3 Cable, Old Creole Days; Scribners.
- 2 Davis, Soldiers of Fortune; Scribners.
- 2 Deland, Old Chester Tales; Harpers.
- 4 Dickens, Old Curiosity Shop; MacMillan.
- 3 Ford, Hon. Peter Sterling; Holt.
- 4 Kipling, Kim; Doubleday.
- 5 Kipling, The Light That Failed; Dutton.
- 4 Redde, Cloister and the Hearth; Dutton.
- 3 Parker, Right of Way; Grosset.
- 5 Scott, Kenilworth; Dutton.
- 3 Smith, Col. Carter of Cartersville; Houghton.
- 3 Thanet, Man of the Hour.

- 3 Van Dyke, *Little Rivers*; Scribners.
- 3 Van Dyke, *Ruling Passion*; Scribners.

**Non-Fiction.**

- 3 Barrie, Margaret Ogilvy; Scribner.
- 2 Bennett, *How to Live on 24 Hours a Day*.
- 3 DeLoach, *Rambles with John Burroughs*; Doran.
- 3 Driggs, *Heroes of Aviation*.
- 3 Franck, *Four Months Afoot in Spain*.
- 3 Rolfe, *Shakespeare, the Boy*.
- 3 Turley, Charles, *The Voyage of Captain Scott*.
- 4 Wald, *House on Henry Street*.
- 3 Warner, *My Summer in a Garden*.
- 3 Wilson, Francis, *The Eugene Fields I Knew*.
- 2 Wilson, Woodrow, *On Being Human*.

**ENGLISH—FOURTH YEAR**

(One Unit)

**FIRST SEMESTER.**

**Composition**—The composition work of the fourth year should be of a more general nature than that of the previous years. There should be greater freedom in choice of literary forms. Continue the work in argumentation requiring at least one argument of considerable length. Review thoroughly the principles of unity, coherence, emphasis in sentences, paragraphs and compositions. Pupils should be able to use correct, forceful, clear and idiomatic English.

**Oral English**—The pupils of the fourth year should be able to appear before the class or before the whole school and make a clear, forceful speech. He should be able to preside satisfactorily at class meets or general meetings. Place emphasis on logical development of thought and pleasing manner of presentation.

**Literature**—English Literature: this should be taken up in connection with the selections read as indicated in the outline for American Literature. A definite study of the various periods and movements in English Literature should, however, be given. The value to a high school student of that portion of the literature before the Revival of Learning is somewhat doubtful, but may be briefly studied if the teacher deems such study advisable. Considerable attention should be given to the Age of Elizabeth, the Puritan Age, the Literature of Restoration, the Literature of the Eighteenth century, the Romantic period and the Victorian Age. In connection with each of these, notice not only the characteristics of leading writers, but also the political, religious and economic tendencies and conditions of the time. The mere incidents in the lives of the various writers are of minor importance compared to the general movement. It is recommended that a suitable text be in the hands of the pupil for this work. Three classics should be studied intensively.

Modern English Poetry.

Modern Essays.

Carlyle's Essay on Burns.

Macaulay's Life of Johnson.

Macbeth.

Hamlet

**SECOND SEMESTER.**

Continue the study of English literature. Brief courses in one of the following are suggested: journalism, commercial correspondence, short story, dramatization. It is recommended that each pupil be provided with a handbook of English, such as Wooley's "Handbook of English" or some other good manual, to use as a self help in theme work.

## FOURTH YEAR READING LIST

## Fiction.

Value. Author. Title. Publisher.

- 3 Allen, Choir Invisible; American News.
- 4 Barrie, Sentimental Tommy; Crowell.
- 4 Bennett, Anna of the Five Towns; Doran.
- 2 Burnett, T. Tembaron; Scribners.
- 5 Black, Alexander. Great Desire; Harpers.
- 5 Cervantes, Don Quixote; Coates.
- 3 Chesterton, Innocence of Father Brown; John Lane, New York.
- 4 Crawford, Mr. Isaacs; MacMillan Co.
- 5 Dickens, David Copperfield; Burt.
- 5 Dickens, Pickwick Papers; Burt.
- 5 Eliot, Mill on the Floss; Lovell.
- 5 Eliot, Adam Bede; Lovell.
- 3 Farnol, Broad Highway; Little, Brown Co.
- 3 Gaskell, Cranford; Dutton.
- 4 Hawthorne, Marble Faun; Crowell.
- 5 Hawthorne, Scarlet Letter; Houghton-Mifflin.
- 3 Holmes, Elsie Venner; Houghton.
- 5 Hugo, Les Miserables; Burt.
- 3 Lane, Nancy Stair; Appleton.
- 5 Thackeray, Harry Esmond; Dutton.
- 5 Thackeray, Vanity Fair; Dutton.
- 5 Trollope, Barchester Towers; Dutton.
- 5 Wells, Mr. Britling Sees it Through; Macmillan.
- 4 White, A Certain Rich Man; Macmillan.
- 4 Zangwill, Children of the Ghetto.

## Non-Fiction.

- 3 Bennett, Your United States; Harper.
- 3 Eaton, Green Trails and Upland Pastures.
- 4 Galsworthy, Inn of Tranquility.
- 4 Hazlitt, Table Talk.
- 4 Howells, My Mark Twain; Harper.
- 4 Mitchell, Dream Life; Scribners.
- 4 Muir, Travels in Alaska; Houghton-Mifflin.
- 4 Steiner, Introducing the American Spirit.
- 4 Stevenson, Vailma Letters; Scribners.
- 4 Torrey, Friends on the Shelf.

## Drama—

- 3 Bennett, Arnold, Knoblock.
- 3 Edward, Milestones.
- 3 Brown, Everywoman.
- 4 Barrie, Echoes of the War. (Four little plays)
- 3 Galsworthy, Pigeon; Scribners.
- 2 Goldsmith, She Stoops to Conquer.
- 2 Housman, Prunella.
- 4 Ibsen, Doll's House; Appleton.
- 3 Kennedy, Servant in the House; Harper.
- 3 Loti, Gautier, Daughter of Heaven.
- 4 Maeterlinck, Blue Bird; Dodd.
- 3 McGroarty, Mission Play.
- 3 Noyes, Alfred, Sherwood.
- 3 Rostand, Cyrena de Bergerac.
- 2 Sheridan, The Rivals.
- 2 Syange, Riders of the Sea.
- 2 Yeats, Land of Heart's Desire.
- 3 Zangwill, Melting Pot; MacMillan.

**BOOKS FOR THE TEACHER**

Bates, Arlo, Talks on Teaching Literature; Houghton.  
 Blakely, Gilbert, Teaching Outlines for Studies in English.  
 Briggs and Coffman, Methods of Teaching Reading; Row, Peterson.  
 Carpenter, Baker, Scott., The Teaching of English; Longman.  
 Chubb, Percival, The Teaching of English; MacMillan.  
 Colby, J. R., Literature and Life in School; Houghton.  
 Corson, Hiram, The Aims of Literary Study; MacMillan.  
 Corson, Hiram, The Voice and Spiritual Education; MacMillan.  
 Everts, K. J., Speaking Voice. Principles of Training Simplified and Condensed; Harper.  
 Gardner, E. H., Effective Business Letters; Ronald.  
 Goldwasser, Methods in the Teaching of English; Heath.  
 Greenough, J. B., Words and Their Ways in English Speech; MacMillan.  
 Hunt, T. W., Literature, its Principles and Problems.  
 Moulton, R. G., World Literature and its Place in General Culture; Houghton.  
 Orcutt, W. D., The Writer's Desk Book; Stokes.  
 Palmer, G. H., Self Cultivation in English; Houghton.  
 The Ideal Teacher, Houghton.  
 Perry, Bliss, A Study of Fiction; Houghton.  
 Shuman, E. L., How to Judge a Book; Houghton.  
 Thomas, How to Teach English Classics; Houghton.  
 Trent, Hanson Brewster, An Introduction to English Classics; Ginn & Company.  
 Webster, W. F., English for Secondary Schools; Houghton.

**ARGUMENTATION AND DEBATE**

(One-half Unit.)

First Semester of Eleventh Year:

Topics to be studied:

1. Evidence. Where to get material and how to classify it.
2. The Main issues. Analysis of evidence obtained.
3. The brief. How to construct the outline of the argument.
4. Construction of the argument. Includes suggestions as to how to secure conviction and persuasion.
5. Refutation. Study of various methods. Includes tests of generalizations, analogies, cause and effect.
6. Parliamentary procedure.

Selections from standard authors should be studied for practice in briefing. Contemporary writers are preferred if they are men of influence.

Class debates should be held at least once in two weeks. This subject may be substituted for one half of the English course, and credit should be allowed to the extent of one-half unit.

Participation in interscholastic debates and the practice for such debates may be substituted for part of the class work.

**PUBLIC SPEAKING**

(One-half Unit)

A. Place in the course, one semester of twelfth year.

B. Topics to be studied:

1. Original speaking. This includes impromptu, extempore and memory speaking.
2. Vocal interpretation of literature. This includes the study and giving of good readings or parts from plays.

3. Delivery. Special attention should be given to conversational mode, action, breath control, enunciation and pronunciation.

C. Special suggestions:

1. Extempore speaking should be emphasized more than any other method as it is the practical method in use today.
2. The conversational mode of delivery should be stressed as it gives the pupil originality and ease in speaking.

## FOREIGN LANGUAGES

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One year of Latin, German, French or Spanish receives no credit, but two years receive two units, three years three units, and four years four units.

Schools giving only two years of Latin should teach it largely from the English standpoint to familiarize the pupils with the derivation of the English words and also to develop a broader knowledge of English.

All pupils in our high schools ought to study at least one foreign language. Goethe is said to have remarked, "No one understands his own language until he has mastered three foreign languages." The significance of this statement is apparent. Such study, too, arouses a greater interest in humanity and gives one a broader and more sympathetic outlook on life.

The method of teaching a foreign language should be eclectic. No one method is now considered the best. We demand a combination of such methods as will bring the best results. The eye, ear, hand, tongue—all must be trained to serve in the mastery of a foreign language. We must remember, too, that pupils of different ages demand different methods of instruction.

Too much attention cannot be given to phonetics. A ready and correct pronunciation is absolutely fundamental and necessary. There is not much use to try to teach any language to pupils who stumble and stagger over pronunciation. Reading in concert is excellent drill and conversation is necessary.

The fundamental principles of grammar must be learned in the first year. In the second year there must be a systematic review of these fundamental principles of grammar with advanced work in syntax, which of course, will continue during the entire course. Grammar is necessary for high school and college students. Our tendency to get away from it is bad and very much to be deplored.

Composition should be systematically pursued either in connection with the classics used as reading material or as separate work. Free composition is to be desired, but for high school pupils, it is wise to use also a regular composition book. Two recitations each week may well be devoted to this work which carries with it grammar review and conversation.

One cannot over-emphasize the importance of the systematic and persistent building of an active working vocabulary. This should not be given up at the end of the first year and left to the pupils themselves, as is too often the case. High school pupils will not, of their own accord, continue to build up such a vocabulary.

### LATIN

The following course has been devised to meet the growing demand to emphasize the practical value of LATIN:

#### THE FIRST YEAR LATIN: (One Credit)

The aims of the elementary course are to familiarize pupils with the vocabulary and to teach the principles of syntax. The contents of any standard first year book should be covered as far as possible. Often the more difficult constructions in the text are left until the first month of the third semester.

**SECOND YEAR LATIN: (One Credit)**

College entrance credits are granted for either of the second year courses mentioned here. It seems to be the general opinion that the contents of four books of Caesar is too far advanced for students having two semesters of preparation. There are possible, therefore, two courses for the second year: a course consisting of simple reading matter such as *Fabulae Faciles* and *Biographies* and two books of Caesar, or the course comprising four books of Caesar alone.

**THIRD YEAR LATIN: (One credit)**

Those pupils who have pursued the first course may read two books of Caesar and three orations of Cicero. Those who have followed the second course will naturally study six orations of Cicero. Selected letters of Cicero may be found a profitable substitute for part of his orations.

**FOURTH YEAR LATIN. (One credit)**

Recommended for the fourth year are six books of Virgil's *Aeneid* or its equivalent: 1500 lines of Ovid and selections from the *Aeneid* amounting to three books. Study of appropriate pictures and classical myths appearing in English literature is interesting and profitable collateral work.

**Composition Work**—The principles of grammar are best understood by actual practice of translating short English sentences into Latin. One day a week is often devoted to this work. Another method is favored by many: the daily assignments of a few sentences based on the difficult constructions of the lesson.

**Methods**—There are many devices that may be used to stimulate interest in Latin study in the second and third years. Much can be learned of Roman customs and history from Latin clubs and programs. Miss Paxon's *Handbook for Latin Clubs* is an excellent aid for this work. Games are greatly favored as an attractive way of conducting vocabulary drills and forms of a syntax. The *Classical Journal* prints the addresses of several companies handling these games. In order to increase the comprehension of the English language, the more common Latin stems should be studied in connection with their many derivations. Derivation blanks may be procured and used with satisfactory results. A great variety of practical exhibit work based on classical mythology, Roman customs, architecture, history and derivations may be successfully worked up. These exhibits are intended to have two effects; to intensify the pupils' interest in the practical value of Latin and to attract others to the Latin course. A very helpful aid in developing this phase of Latin work may be found in Miss Sabin's *Manual on Relation of Latin to Practical Life*. (Frances E. Sabin, Madison, Wis.)

1. *Relation of Latin to Practical Life*, Frances Ellis Sabin; F. E. Sabin, 244 N. Oak Park Ave., Oak Park, Ill.
2. *Handbook for Latin Clubs*, Susan Parson; D. C. Heath & Co. 623S Wabash Ave., Chicago, Ill.
3. *Classical Journal*, December 1921, University of Chicago Press; 58th. St. & Ellis Ave., Chicago, Ill.

**SPANISH**

Spanish pronunciation seems to offer real difficulties to many pupils. However, records may be procured, spoken by native Spaniards, which will assist the teacher and train the ear and tongue of the pupil. Write to the "Student Education Records, Inc.," Lakewood, New Jersey, for records speaking about one year's work from D. C. Heath's "First Spanish Course" by Hills and Ford. Write to "The Iturralde Language Method Company" Alexander Hamilton Hall, 18 Astor Place, New York City, for the Iturralde Method for the Study

of Spanish—a book and twenty double records. There are several other sets of records on the market. These may be used separately or with other courses.

#### FIRST YEAR. (One unit)

There are many beginner's grammars on the market. For the first year's work one can select from the following long list:

Moreno-Lacalle, **Elementos De Espanol**; Benj. Sanborn Co.  
Hills and Ford, **First Spanish Course**; D. C. Heath.  
De Vitis, **Brief Spanish Grammar and a Spanish Grammar**; Allyn & Bacon.

Espinosa-Allen, **Elementary Spanish Grammar**; American Book Co.  
Olmstead, **First Course in Spanish**; H. Holt & Co.  
Dorado, **Primeras Lecciones De Espanol**; Ginn & Co.  
Cherubini, **Curso Practico De Espanol**; The Jno. Winston Co.  
Haussler-Parmenter, **Beginner's Spanish**; Chas. Scribners Co.  
Espinosa-Allen, **Beginning Spanish**; American Book Co.  
Hall, **Poco A Poco and All Spanish Method**. (Two books); World Book Company.

Readers for the first year may be selected from:

Solano, **Cuentos Y Lecturas En Castellano**; Silver Burdett Co.  
Harrison, **Elementary Spanish Reader**; Ginn & Co.  
Pittaro, **A Spanish Reader**; D. C. Heath Co.  
Roessler-Remy, **A First Spanish Reader**; American Book Co.  
Hathaway-Berge-Soler **Easy Spanish Reader**; MacMillan Co.  
Walsh, **Primer Libro De Lectura**; D. C. Heath Co.  
Ray, **Lecturas Para Principiantes**; American Book Co.

#### SECOND YEAR. (One unit.)

A more difficult grammar should be used in the second year, or probably better, some such book as *Outlines of Spanish Grammar* by Hymen Alpern, for review. (D. C. Heath Co.) Some such book as *Ford's Spanish Fables and Verse* may be introduced during the latter half of this year. Selections may be made from the following for reading matter:

Eserich, **Amparo**; American Book Co.  
Eserich, **Fortuna**.  
Valera, **El Pajaro Verde**.  
Doyle-Rivera, **En Espana**; Silver Burdette Co.  
Haussler and Parmenter, **Spanish Reader**; Chas Scribner Co.  
Mapes-Velasco, **Cuba Y Los Cubanos**; Gregg Pub. Co.  
Phipps, **Pajinas Sudamericanas**; World Book Co.  
Sparkman, **Industrial Spanish**; Allyn & Bacon.  
Carrion Asa, **Zaragneta**; Sanborn, Heath, and Silver-Burdette Co's.  
Dorado, **Espana Pintoresca**; Ginn & Co.  
Martinez Sierra **Teatso De Ensueno**; World Book Co.

Those who wish composition texts in addition to the exercises that most of the books now edited for reading contain, can select from the following list:

Crawford, **Spanish Composition**; H. Holt Co.  
Umphrey, **Spanish Prose Composition**; American Book Co.  
Wilkins and Alpern, **Exercise Book in Spanish**; Globe Book Co., N. Y.

### FRENCH

A two year course is required for credit. A combination of the grammatical and direct methods is advised.

#### FIRST YEAR (One unit)

Grammar to the subjunctive, pronunciation, simple French-English and English-French translation, vocabulary drill, frequent dictation. Secure a thorough foundation in grammar, pronunciation and vocabulary, and read simple French stories.

Suggested Library list from which lesson assignments may be made:

Malot, *Sans Famille*; Holt & Co., Chicago.  
 LaBedolliere, *La Mere Michel et Son Chat*.  
 Cerf. & Giese, *Beginning French*; Holt & Co. Chicago.  
 The New Chardenal, Allyn Bacon Co.  
 Meras, *First French Book*; American Book Co.

#### SECOND YEAR. (One Unit)

Persistent drill on pronunciation, verb form, oral work and dictation. Complete the grammar. Read: "L'Abbe Constantine," "Colomba" and one of the following: "La Poudre aux Yeux," "L' Ete de la Saint Martin," or some of the Contes by Maupassant.

Suggested Library list from which lesson assignments may be made:

Daudet, *Trois Contes Choisis*.  
 Labiche, *La Grammaire*.  
 Labiche, *La Poudre aux Yeux*.  
 Labiche, *Le Voyage de M. Perrichon*.  
 Laboulaye, *Contes Bleus*.  
 Mariet, *La Tache du petit Pierre*.  
 Moinaux, *Les Deux Sords*.  
 Daudet, *La Belle—Nivernaise*.  
 Daudet, *Let Petit Chose*.  
 Daudet, *Lettres de Mon Moulin*.  
 Dumas, *La Tulipe Noire*.  
 Dumas, *La Tulipe Noire*.  
 Dumas, *Monte-Chisto*.  
 Dumas, *Les Trois Mousquetaires*.  
 France A., *Le Crime de Sylvestre Bonnard*.  
 Halvey, *Labbe Constantine*.  
 Halvey, *Un Mariage d' Amour*.  
 Maupassant, *Huit Contes Choisis*.  
 Moliere, *L'Avare*.  
 Moliere, *Le Bourgeois Gentilhomme*.  
 Moliere, *Le Medicin Malgre Lui*.  
 Moliere, *Le Misanthrope*.  
 Moliere, *Les Femmes Savantes*.

### GERMAN

#### FIRST YEAR. (One unit.)

The work should be based upon some such book for beginners as SCHMIDT-GLOCKE'S *DAS ERSTE JAHR DEUTSCH*, D. C. Heath Co., or SPANHOOFD'S *ELEMENTARBUCH DER DEUTSCHEN SPRACHE* D. C. Heath Co. The grammar must be thoroughly learned. Easy poems should be committed to memory. A reader with more difficult reading matter should be used, especially toward the end of the year. Selections for this year can be made from the following list:

Kern, *German Stories Retold*; American Book Co.  
 Guerber, *Marchen and Erzählungen*; D. C. Heath Co.  
 Lange, *Easy German Reading*; Allyn & Bacon.  
 Allen, *Daheim*; H. Holt & Co.  
 Anderson, *Marchen*; D. C. Heath & Co.  
 Seeligmann, *Altes and Neues*; Ginn & Co.

#### SECOND YEAR. (One unit.)

The work of this year should include a thorough review of grammar, using some such book as Harris *GERMAN GRAMMAR*, American Book Co. Use, too, during this year, some such composition book as Wesselhoelft's *GERMAN EXERCISES*, D. C. Heath Co. Some such book of poems as Dillard's *AUS DEM DEUTSCHEM DICHTER-*

WALD, American Book Co., is advised—many poems being read, some learned. Selections be made from the following list for semester's reading:

Storm, **Immensee**; American Book Co.  
 Stokl, **Alle Fünf**; D. C. Heath Co.  
 Spyri, **Monti, Der Geissbub**; D. C. Heath Co.  
 Benedix, **Nein**; D. C. Heath Co.  
 Volkmann, **Kleine Geschichte**; D. C. Heath Co.  
 Menckwitz and Unwerth, **Edelsteine**; Ginn & Co.  
 Grimm, **Marchen**; American Book Co.  
 Spyri, **Rosenresli**; D. C. Heath Co.

SECOND YEAR— Second Semester.

Selections can be made from the following list:  
 Bluthgen, **Das Peterle Von Nurnberg**; American Book Co.  
 Bolt, **Peterle am Lift**; D. C. Heath Co.  
 Wilhemini, **Einer Muss Heiraten**; H. Holt & Co.  
 Benedix, **Eigenainn**; H. Holt & Co.  
 Heyse, **L'Arrabbiata**; Allyn & Bacon.  
 Von Hillern, **Hoher als die Kirche**; Allyn & Bacon.  
 Zschokke, **Der Zerbrochene Krug**; Allyn & Bacon.  
 Elz, **Er Ist Nicht Eifersuchtig**; D. C. Heath Co.

## MATHEMATICS

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In the reorganization of Secondary Education, it is being demanded that every subject must have a direct social objective. Mathematics has this, but it has not always been taught with the social aim in mind. Too often it has been taught as an end in itself and not as a means of determining the pupil's welfare. From now on, if it remains in the curriculum, it must have a social value.

In all mathematics courses emphasis should be placed upon the process of thinking involved, rather than upon the mere manipulation of abstract numbers and figures. Problems which deal with every day life should be introduced, thus stimulating the students' interest, and revealing the practical value of high school mathematics. A certain minimum amount of knowledge must be acquired as a working basis. This is indispensable for further study of mathematics, of the sciences and for college entrance. The courses have been arranged with this in view, and the minimum requirement is one year of elementary algebra and one year of plane geometry. Those pupils who will continue their education in technical and engineering colleges, should elect an additional half year each of algebra, solid geometry, and plane trigonometry.

### Elementary Algebra (One unit.)

#### I.

The division by months is only suggestive but the entire course should be completed in one year.

- (1) The pupils should be introduced to algebraic symbols, simple equations and to the positive and negative sign.
- (2) Pupils must be taught to represent quantities and to indicate mathematical relations and operations by means of the algebraic symbols and to translate these symbols into words.
- (3) Signs of aggregation should be mastered, first the removal of the symbols from algebraic expressions and then the inserting of specified terms of expressions with the symbols.
- (4) Addition and subtraction of numbers having a common factor.
- (5) Multiplication and division of monomials and polynomials by a monomial.
- (6) To form equations for simple problems.

#### II.

- (1) The meaning of "plus" and "minus" should be explained clearly. Use the graph. It will be a great help in teaching this.
- (2) Solving examples that employ transposition.
- (3) Checking or verifying results.

#### III.

- (1) Four fundamental operations with positive and negative quantities should be taken up now with marked emphasis on accuracy and then speed. Literal co-efficients and exponents should be taken up as well as the numerical co-efficients and exponents. The pupil should have no more difficulty with the one than the other.
- (2) Multiplication and division of polynomials by polynomials.

## IV.

- (1) A great many problems should be given to teach the pupil to form equations and to use algebraic signs and symbols. Also teach them to write problems from equations given.
- (2) Introduce simultaneous equations by use of graphs.
  - (a) Graphic representation of statistics.
  - (b) Graphic representation of problems of motion.
  - (c) Graphic representation of simple or linear equations.
  - (d) Graphic representations of simultaneous equations.
- (3) When graphs are mastered the pupils are interested in checking the graph by means of some other method. The solution of simultaneous equations can now be taught by eliminating by (a) addition and subtraction (b) substitution (c) comparison. Care should be taken that pupils know the name of each method and that they learn to choose the method best suited to each problem.
- (4) Emphasize the fact that there exists only one value for X and Y and that the same values are found by all methods.
- (5) Check all results.

## V.

- (1) Special rules for Multiplication.
- (2) Factoring. Since factoring is perhaps the most essential part of algebra, plenty of time should be given to the subject. Oral work is necessary here and all factoring should be done by inspection. At least seven type forms should be given in the first year and care should be taken that speed as well as accuracy is acquired. The seven important cases are:
  - (1) Common monomial factor.
  - (2) Perfect trinomial square.
  - (3) Difference of two squares.
  - (4) Sum of two cubes.
  - (5) Difference of two cubes.
  - (6) Cross Products.
  - (7) Grouping.

## VI.

- (1) Highest Common Factor and Least Common Multiple should be taught in their simple forms. This gives a good review of factoring.
- (2) Reducing fractions to lowest terms.
- (3) Reduction of fractions to Common Denominator.
- (4) Reduction of mixed expressions to fractions with Common Denominator.

## VII.

- (1) Addition and subtraction of fractions.
- (2) Multiplication and division of fractions.
- (3) Equations that involve all forms of fractions.
- (4) Problems that involve fractions.

## VIII.

- (1) Involution and Evolution.
- (2) Powers and roots require drill for accuracy.
- (3) Pupils should learn squares of numbers from 1 to 25 and cubes from 1 to 12.
- (4) Square root needs particular attention as it is so very important in quadratics.

## IX.

- (1) Can be devoted to radical and simple quadratics or to a general review of the year's work by means of supplementary examples and problems.

### Advanced Algebra (One-half unit)

The course in advanced algebra is a semester subject to be offered not earlier than the third year and after the pupil has had a course in Plane Geometry. The work serves as a review of elementary algebra as well as a study of the more advanced principles. The student should be sufficiently developed at this stage to gain some appreciation of Mathematics as a science. A brief outline of the work is as follows:

#### I.

- (1) Review of fundamental operations, factoring, L. C. M., H. C. F.
- (2) Multiplication and division with exponents that are literal, also fractional exponents.
- (3) Development of more difficult work in complex fractions, continued fractions, H. C. F., L. C. M.
- (4) Review simultaneous equations, by the four methods, also formula method.

#### II.

- (1) Radicals of all kinds.
- (2) Quadratic equations by five methods.
  - A. Factoring.
  - B. Complete square, 1st and 2nd methods.
  - C. Formula.
  - D. Solving by use of graph.

#### III.

- (1) Simultaneous quadratic equations with the special method of solution.
- (2) Problems involving simultaneous quadratics.

#### IV.

- (1) Progressions, Arithmetical and Geometrical.
- (2) Ratio and Proportion.
- (3) Logarithms sufficient to illustrate the workings of exponents.

#### V.

- (1) The last two weeks of the course should be given over to review. Where the class is sufficiently strong the Binomial Theorem may be developed.

### Geometry (One unit)

The disciplinary value of Geometry, to the extent that we formerly thought of it, is seriously in question. Psychologists, however, will grant that what there is in method and general procedure can be transferred. The method of forming conclusions has all the power of formal logic. What the lever is to the mechanic in lifting weights, logical mathematical procedure is to the mathematician in solving his problem. Mechanical advantage to the one corresponds to mathematical advantage to the other.

In its practical value, Geometry cultivates space intuitions and appreciation of, and control over, forms existing in the material world, which can be secured from no other topic in the high school curriculum. Its applications to mensuration and the satisfaction derived by the pupil in unifying the formulas of mensuration already met by him in arithmetic, are well recognized by all teachers.

The lists of theorems which follow are not to be taken as exhaustive and it is distinctly understood that theorems may be added at the discretion of the teacher, e. g.: the theorem on the existence of regular polyhedra may find a place in certain courses. Some

theorems are omitted only with the understanding that they may be inserted as exercises for the student.

The Minimum of theorems follows:

### I. Theorems for Informal Proof

(The following theorems may be stated as assumptions, or may be given such informal proof as the circumstances may demand.)

1. All straight angles are equal.
2. All right angles are equal.
3. The sum of two adjacent angles whose exterior sides lie in the same straight line equals a straight angle.
4. If the sum of two adjacent angles equals a straight angle, their exterior sides form a straight line.
5. Only one perpendicular can be erected from a given point in a given line.
6. The length of a circle (circumference) lies between the lengths of the perimeters of the inscribed and circumscribed convex polygons.
7. The area of a circle lies between the areas of inscribed and circumscribed convex polygons. (It is recommended that statements 6 and 7 be used as definitions to be inserted as context.)
8. Two lines parallel to the same line are parallel to each other.
9. Vertical angles are equal. (Very informal proof sufficient.)
10. Complements of equal angles are equal.
11. Supplements of equal angles are equal.
12. The bisectors of vertical angles lie in a straight line.
13. Any side of a triangle is less than the sum of the other two and greater than their difference.
14. A diameter bisects a circle.
15. A straight line intersects a circle at most in two points.

### II. Congruence of Triangles

1. Any two triangles ABC and A'B'C' are congruent if:
 

(1) $a = a'$	$b = b'$	$C = C'$
(2) $a = a'$	$B = B'$	$C = C'$
(3) $a = a'$	$b = b'$	$c = c'$
(4) $a = a'$	$c = c'$	$C = C' = 90^\circ$
2. A triangle is determined when the following are given: (1) a, b, C; (2) a, B, C; (3) a, b, c; (4) a, c,  $C = 90^\circ$  (Synonymous to 1.)
3. Construction of triangles from given parts; measurement of unknown parts by ruler and protractor. Given: (1) a, b, C; (2) a, B, C; (3) a, b, c; (4) a, b, C, possible two solutions. (This is the fundamental elementary idea of trigonometry.)
4. In any two triangles if  $a = a'$  and  $b = b'$ , either the inequalities  $c \neq c'$  or  $C \neq C'$  is a consequence of the other.

### III. Congruent Right Triangles

1. Two right triangles are congruent if, aside from the right angles, any two parts, not both angles, in the one are equal to corresponding parts of the other.
2. If two oblique lines c and c' be drawn from a point in a perpendicular p to line AA', cutting off distances d and d', then any one of the equalities  $c = c'$ ,  $d = d'$ ,  $A = A'$ ,  $B = B'$ , is a consequence of any other.
3. A diameter perpendicular to a chord bisects the chord, the subtended angle at the center, and the subtended arc; conversely, a diameter which bisects a chord is perpendicular to it.
4. If two oblique lines, c and c', be drawn from a point in a perpendicular p to a line AA', cutting off unequal distances d and d',

then either of the inequalities  $c \neq c'$ ,  $d \neq d'$ , is a consequence of the other. (In particular,  $c$  is greater than  $p$ .)

5. If, in a triangle  $ABC$ ,  $a = b$ , the perpendicular from  $C$  on  $c$  divides the triangle into two congruent triangles.

6. In a triangle  $ABC$ , either of the equations  $a = b$ ,  $A = B$ , is a consequence of the other.

7. In a triangle  $ABC$ , either of the statements  $a \neq b$ ,  $A \neq B$ , is a consequence of the other.

#### IV. Subtended Arcs, Angles and Chords

1. In the same circle, or in equal circles, any one of the equations  $d = d'$ ,  $k = k'$ ,  $c = c'$ ,  $O = O'$ , is a consequence of any other one of them. (A6, 7, 8, 9, G9.)

2. In any circle an angle at the center is measured by its intercepted arc. (Only the commensurable case.)

3. If a circle is divided into equal arcs, the chords of these arcs form a regular polygon.

4. To construct an angle equal to a given angle. (Regular polygons and other approximate constructions may be drawn by means of the protractor.)

#### V. Perpendicular Bisectors

1. The perpendicular bisector of a line-segment is the locus of points equidistant from the ends of the segment.

2. To draw the perpendicular bisector of a given line-segment.

3. To erect a perpendicular at a given point in a line.

4. To construct a perpendicular from a given point to a given line. (Corollary to 2.)

5. To bisect a given arc or angle. (See III, 3.)

6. To inscribe a square in a circle.

7. One, and only one, circle can be circumscribed about any triangle.

8. Three points determine a circle. Two circles can intersect, at most, in two points; this will happen when the distance between their center is less than the sum of the radii and greater than the difference of the radii. (Corollary to 7.)

9. Given an arc of a circle, to find its center. (Corollary to 7.)

10. A circle may be circumscribed about any regular polygon.

11. The perpendicular bisectors of the sides of a triangle meet at one point.

#### VI. Bisectors of Angles.

1. The bisector of any angle is the locus of points equidistant from the sides of the angle.

2. A circle can be inscribed in any triangle. (Construction to be given.)

3. A circle can be inscribed in any regular polygon.

4. Of the inscribed and circumscribed regular polygons of  $n$  and  $2n$  sides for a given circle, to draw the remaining three polygons when one is given.

5. The bisectors of the angles of any triangle meet at one point.

#### VII. Parallels.

1. When two lines are cut by a transversal, the alternate interior angles are equal only, if those two lines are parallel.

When two lines are cut by a transversal, the alternate interior angles are unequal, only if the lines are not parallel.

2. When two lines are cut by a transversal, the corresponding angles are equal, and the two interior angles on the same side of the transversal are supplementary, only if the two lines are parallel.

3. The two lines in the same plane perpendicular to the same line are parallel. (Only one perpendicular can be let fall from a point without a line to that line.)

4. A line perpendicular to one of two parallels is perpendicular to the other also.

5. If two angles have their sides respectively parallel or respectively perpendicular to each other, they are either equal or supplementary.

6. Through a given point draw a straight line parallel to a given straight line.

7. A parallelogram is divided into two congruent triangles by either diagonal.

8. In any parallelogram, the opposite sides are equal, the opposite angles are equal, the diagonals bisect each other.

9. In any convex quadrilateral, (a) if the opposite sides are equal, or (b) if the opposite angles are equal, or (c) if one pair of opposite sides are equal and parallel, or (d) if the diagonals bisect each other, the figure is a parallelogram.

### VIII. Angles of a Triangle

1. In any triangle the sum of the angles is equal to two right angles.

2. In any triangle any exterior angle is equal to the sum of the two opposite interior angles.

3. The sum of the interior angles of a polygon of  $n$  sides is  $2(n-2)$  right angles.

4. To inscribe a regular hexagon in a circle. (To construct an angle of  $60^\circ$ . Synonymous to 4.)

### IX. Inscribed Angles

1. An angle inscribed in a circle is measured by half of its intercepted arc.

2. Angles inscribed in the same segment are equal to each other.

3. An angle inscribed in a semicircle is a right angle.

4. The two arcs intercepted by parallel secants are equal.

5. The angle between a tangent and a chord is measured by half the intercepted arc.

6. The angle between any two lines is measured by half the sum, or half the difference, of the two arcs which they intercept on any circle, according as their point of intersection lies inside of, or outside of, the circle.

7. The tangent to a circle at a given point is perpendicular to the radius at that point.

8. For a given chord, construct a segment of a circle in which a given angle can be inscribed.

9. Draw a tangent to a given circle through a given point.

10. The tangents to a circle from an external point are equal.

### X. Segments Made by Parallels

1. If a series of parallel lines cut off equal segments on one transversal, they cut off equal segments on any other transversal.

2. The segments cut off on two transversals by a series of parallels are proportional. (Only the commensurable case.)

3. A line divides two sides of a triangle proportionally, the segments of the two sides being taken in the same order, only if, it is parallel to the third side. (Only the commensurable case.)

4. Divide a line-segment into  $n$  equal parts or into parts proportional to any given segments.

5. Find a fourth proportional to three given line-segments.

### XI. Similar Triangles

1. Two triangles  $ABC$  and  $A'B'C'$  are similar if:

$$(1) \quad A = A' \quad B = B' \quad C = C'$$

$$\text{or } (2) \quad a = ka' \quad b = kb' \quad c = C'$$

$$\text{or } (3) \quad a = ka' \quad b = kb' \quad c = kc'$$

where  $k$  is a constant factor of proportionality. (See preface, Article 7.)

2. Given a fixed point  $P$  and a circle  $C$ , the product of the two distances measured along any straight line through  $P$ , from  $P$  to the points of intersection with  $C$ , is constant. This product is also equal to the square of the tangent from  $P$  to  $C$  if  $P$  is an external point.

3. The bisector of any angle of a triangle divides the opposite sides into segments proportional to the adjacent sides.

4. Construct a triangle similar to a given triangle.

### XII. Similar Figures

1. Polygons are similar only if they can be decomposed into triangles which are similar and similarly placed.

2. Regular polygons of the same number of sides are similar.

3. The perimeters of similar polygons are proportional to any two corresponding lines of the polygons.

4. Construct a polygon similar to a given polygon.

### XIII. Similar Right Triangles

(Numbers 2, 3, 4, following should have a place where time for their discussion can be secured.)

1. Any two right triangles are similar if an acute angle of the one is equal to an acute angle of the other, or if any two sides of one are proportional to the corresponding sides of the other.

2. For a given acute angle  $A$ , the sides of any right triangle  $ABC$  ( $C=90^\circ$ ) form fixed ratios, called the sine ( $a/c$ ), the cosine ( $b/c$ ) the tangent ( $a/b$ ).

3. Computation of a two-place table of sines, cosines, tangents from actual measurements.

4. Solution of right triangles with given parts by use of the preceding table of ratios. (Height and distance exercises.)

### XIV. Right Triangles

1. In any right triangle  $ABC$  the perpendicular let fall from the right angle upon the hypotenuse divides the triangle into similar right triangles, each similar to the original triangle.

2. The length of the perpendicular  $p$  is the mean proportional between the segments  $m$  and  $n$  of the hypotenuse; i. e.,  $p^2=mn$ .

3. Either side,  $a$  or  $b$ , is the mean proportional between the whole hypotenuse  $c$  and the adjacent segments  $m$  or  $n$ ; that is,  $a^2=cm$ ;  $b^2=cn$ .

4. To find a mean proportional between two given line-segments.

5. The sum of the squares of the two sides of a right triangle is equal to the square of the hypotenuse:  $a^2+b^2=c^2$ .

(It should be noticed that the proposition can be proved either algebraically or geometrically.)

6. In any triangle  $ABC$ , if  $B$  is less than  $90^\circ$ , then  $b^2=a^2+c^2-2cm$ ; if  $B$  is greater than  $90^\circ$ , then  $b^2=a^2+c^2+2cm$ , where  $m$  is the projection of  $a$  on  $c$ .

7. Given the radius of a circle and a perimeter of an inscribed regular polygon of  $n$  sides, to find the perimeter of the circumscribed regular polygon of  $n$  sides and the perimeter of the inscribed regular polygon of  $2n$  sides.

### XV. Areas

1. The area of a rectangle is the product of its base and its altitude; i. e.,  $a=bh$ .

(This formula may be taken as the definition of area.)

2. Parallelograms or triangles of equal bases and altitudes are equivalent.

3. The area of a parallelogram is the product of its base and its altitude, i. e.,  $a = bh$ .

4. The area of a triangle is one-half the product of its base and its altitude; i. e.,  $a = \frac{1}{2}bh$ .

5. The area of a trapezoid is one-half the product of its altitude and the sum of its bases; i. e.,  $a = \frac{1}{2}(b_1 + b_2)h$ .

6. The areas of similar triangles or polygons are proportional to the squares of corresponding lines.

7. The area of a regular polygon is one-half the product of its perimeter and its apothem.

8. The area of any circle is one-half the product of its circumference and its radius.

9. The areas of two circles are proportional to the squares of their radii. (May be treated as suggested in preface, article 3.)

10. Construct a square equivalent to the sum of two given squares. (Pythagorean proposition.)

11. Construct a square equivalent to a given rectangle. (Mean proportional.)

### SOLID GEOMETRY

(One-half unit)

In solid Geometry the utilitarian features play an increasingly important part. The mensuration involved in plane geometry is so simple as to be fairly well understood as presented in arithmetic. Solid Geometry, however, offers a rather extended field for practical mensuration in connection with algebraic formulas. A further application is found in the power afforded to visualize solid forms from flat drawings, a power that is essential to the artisan and valuable to every one.

A minimum of theorems follows:

#### I. Theorems for Informal Proof

1. If two planes cut each other, their intersection is a straight line.

2. Two dihedral angles have the same ratio as their plane angles.

3. The face of every section of a cone made by a plane passing through the vertex of the cone is a triangle.

4. The face of every section of a cylinder made by a plane passing through an element of the cylinder is a parallelogram.

5. The area of a sphere lies between the areas of a circumscribed and inscribed convex polyhedrons.

6. The volume of a sphere lies between the volumes of circumscribed and inscribed convex polyhedrons.

(It is recommended that statements 5 and 6 be used as definitions to be inserted at context.)

7. The projection of a straight line upon a plane is a straight line.

#### II. Corollaries from Plane Geometry

(The ability to make the transfer from plane geometry to solid geometry, and vice versa, in forming conceptions and in logical deductions is of the utmost importance. The following theorems are easily reducible to plane geometry in, at most, two or three planes. The intention is that careful proofs be given, but the student should see that these theorems result immediately from known theorems of plane geometry.)

1. The intersections of two parallel planes with any third plane are parallel.

2. A plane containing only one of two parallel lines is parallel to the other.

3. If a straight line is parallel to a plane, the intersection of the plane with any plane drawn through the line is parallel to the line.

4. Through a given point, only one plane can be passed parallel to two straight lines not in the same plane.

5. Through a given straight line only one plane can be passed parallel to any other given straight line in space, not parallel to the first.

6. Through a given point, only one plane can be drawn parallel to a given plane.

7. If a perpendicular  $PO$  be let fall from a point  $P$  to a plane  $L$ , any one of the equalities  $a=a'$ ,  $c=c'$ ,  $B=B'$ ,  $A=A'$  is a consequence of any other of them, and any one of the inequalities  $a=/ $a'$ ,  $c=/ $c'$ ,  $B=B'$ ,  $A=A'$  is a consequence of any other of them.$$

8. The perpendicular  $PO$  is shorter than any oblique line.

9. Two straight lines are parallel to each other only if they are both perpendicular to some one plane.

10. If two straight lines are parallel to a third, they are parallel to each other.

11. Two planes are parallel to each other only if they are both perpendicular to some one straight line.

12. The locus of points equidistant from the extremities of a straight line is a plane perpendicular to that line at its middle point.

13. If two straight lines are cut by three parallel planes, their corresponding segments are proportional.

14. The locus of points equidistant from two intersecting planes is the figure formed by bisecting planes of their dihedral angles.

### III. Planes and Lines

1. If a straight line is perpendicular to each of two other straight lines at their point of intersection, it is perpendicular to every line in their plane through the foot of the perpendicular.

2. Every perpendicular that can be drawn to a straight line at a given point lies in a plane perpendicular to the line at the given point. (Corollary to 1.)

3. Through any point only one plane can be drawn perpendicular to the given line. (Corollary to 1 and II, 11)

4. Through a given point only one perpendicular can be drawn to any given plane. (Corollary to 1.)

5. If two angles have their sides respectively parallel and lying in the same direction, they are equal, and their planes are parallel.

6. If a line meets its projection on a plane, any line of the plane perpendicular to one of them at their intersection is perpendicular to the other also.

7. Between any two straight lines not in the same plane only one common perpendicular can be drawn, and this common perpendicular is the shortest line that can be drawn between the two lines.

8. Two planes are perpendicular to each other only if, a line perpendicular to one of them at a point in their intersection lies in the other.

9. If a straight line is perpendicular to a plane, every plane passed through the line is perpendicular to the first plane. (Corollary to 8.)

10. If two intersecting planes are each perpendicular to a third plane, their intersection is also perpendicular to that plane. (Corollary to 8.)

11. Through a given straight line oblique to a plane only one plane can be passed perpendicular to the given plane.

12. The acute angle which a straight line makes with its own

projection on a plane is the least angle which it makes with any line of the plane.

13. Two right prisms are congruent if they have congruent bases and equal altitudes.

14. If parallel planes cut all the lateral edges of a pyramid, or a prism, the sections are similar polygons; in a prism, the sections are congruent; in a pyramid, their areas are proportional to the squares of their distances from the vertex.

15. Every section of a circular cone made by a plane parallel to its base is a circle, the center of which is the intersection of the plane with the axis.

16. Parallel sections of a cylindrical surface are congruent.

#### IV. Spheres

1. Every section of a sphere made by a plane is a circle. (Several corollaries may be added.)

2. The intersection of two spheres is a circle whose axis is the line of centers.

3. The shortest path on a sphere between any two points on it is the minor arc of the great circle which joins them.

4. A plane is tangent to a sphere only if it is perpendicular to a radius at its extremity.

5. A straight line tangent to a circle of a sphere lies in a plane tangent to the sphere at the point of contact.

6. The distances of all points of a circle on a sphere from either of its poles are equal.

7. A point on the surface of a sphere, which is at the distance of a quadrant from each of two other points, not the extremities of a diameter, is the pole of the great circle passing through these points.

8. A sphere can be inscribed in or circumscribed about any given tetrahedron.

9. A spherical angle is measured by the arc of a great circle described from its vertex as a pole and included between its sides (produced if necessary.)

#### V. Spherical Triangles and Polygons

(Every theorem stated here may also be stated as a theorem on polyhedral angles.)

1. Each side of a spherical triangle is less than the sum of the other two sides.

2. The sum of the sides of a spherical polygon is less than  $360^\circ$ .

3. The sum of the angles of a spherical triangle is greater than  $180^\circ$  and less than  $540^\circ$ .

4. If  $A'B'C'$  is the polar triangle of  $ABC$ , then, reciprocally,  $ABC$  is the polar of  $A'B'C'$ .

5. In two polar triangles each angle of the one is the supplement of the opposite side in the other.

6. Vertical spherical triangles are symmetrical and equivalent.

7. Two triangles on the same sphere are either congruent or symmetrical if:

$$\begin{array}{lll} a = a' & B = b' & c = c' \\ \text{or } a = a' & b = b' & C = C' \\ \text{or } a = a' & B = B' & C = C' \\ \text{or } A = A' & B = B' & C = C' \end{array}$$

8. Either of the equations  $a=b$ ,  $A=B$  is a consequence of the other.

#### VI. Mensuration

(The relation between the areas and volumes of similar solids may be treated as corollaries in individual cases. It is understood

that certain statements concerning limits may be assumed either explicitly or implicitly. These are not stated as theorems.

1. An oblique prism is equivalent to a right prism whose base is a right section of the oblique prism and whose altitude is a lateral edge of the oblique prism.

2. A plane passed through two diagonally opposite edges of a parallelopiped divides it into two equivalent triangular prisms.

3. The lateral area of a prism is the product of a lateral edge and the perimeter of a right section. (Corollary of plane geometry.)

4. The lateral area of a regular pyramid is one-half the product of the slant height and the perimeter of the base. (Corollary of plane geometry.)

5. The lateral area of a right circular cylinder is the product of the altitude and the circumference of the base; i. e.,  $S = 2\pi rh$

6. The lateral area of a right circular cone is one-half the product of the slant height and the circumference of the base.

7. The lateral area of a frustum of a regular pyramid is one-half the product of the slant height and the sum of the perimeters of the bases.

8. The lateral area of a frustum of a right circular cone is one-half the product of the slant height and the sum of the circumferences of the bases.

9. The area of a zone is the product of its altitude and the circumference of a great circle.

10. The area of a sphere is the product of its diameter and the circumference of a great circle.

11. The area of lune is the surface of a sphere as the angle of the lune is to  $360^\circ$ .

12. The area of a spherical triangle is to the area of the sphere as its spherical excess is to  $720^\circ$ .

13. The volume of a rectangular parallelopiped is the product of its three dimensions. (This may be taken as a definition.)

14. The volume of any parallelopiped is the product of its base and altitude.

15. The volume of any prism is the product of its base and its altitude.

16. The volume of any pyramid is one-third the product of its base and its altitude.

17. The volume of a circular cylinder is the product of its base and its altitude.

18. The volume of a circular cone is one-third the product of its base and its altitude.

19. The volume of a spherical sector is one third the product of the radius and the zone which is its base.

20. The volume of a sphere is one-third the product of its radius and its area.

## PLANE TRIGONOMETRY

(One-half unit.)

The work in Trigonometry is open to pupils who have completed the work in third semester algebra and solid Geometry. In Trigonometry as in no other high school mathematics the student can realize the practical value of algebra and plane geometry. Much field work should be done in order to make the work concrete. Where a transit is available, heights of vertical objects should be calculated and various triangles should be laid out and the areas computed.

The following minimum outline of work is suggested:

1. Definitions and the relations of the six trigonometric functions as ratios; circular measurement of angles.
2. Familiarity with the graphs of each of the six trigonometric functions.
3. Functions of complementary and supplementary angles.
4. Inverse functions.
5. Tracing the changes in sign of each of the six functions as the angle passes from one quadrant to another.
6. The derivation of the values of the six trigonometric functions for angles of  $0^\circ$ ,  $30^\circ$ ,  $45^\circ$ ,  $60^\circ$ ,  $90^\circ$ ,  $180^\circ$ , and  $270^\circ$ .
7. Solution of right triangles and applications involving angles of  $30^\circ$ ,  $45^\circ$  and  $60^\circ$ .
8. Proofs of principal formulas in particular those for sine, cosine, and tangent of the sum and difference of two angles, of double an angle, and half an angle, and the transformation from the sum to the product of two sine or cosine functions.
9. Solutions of numerous identities applying the formulas developed.
10. Solutions of trigonometric equations of a simple character.
11. Logarithms (five-place table.)
12. Derivation of all formulas involved in the solution of oblique triangles.
13. Solution of oblique triangles.
14. Practical applications involving the solution of oblique triangles.

#### Reference Material

Teaching of Geometry, Florence Milner; D. C. Heath & Co.  
 A Source Book of Problems for Geometry, Mabel Sykes; Allyn & Bacon  
 Real Problems in Geometry, James F. Millis; Teachers College Record, March, 1919.  
 Real Problems in Geometry and Algebra, School Science and Mathematics.  
 Lessons in Experimental Geometry, Hall & Stevens; The Macmillan Co.  
 Numerous Problems in Geometry, J. G. Estill; Longman Green & Co.  
 Mensuration, G. B. Halsted; Ginn and Co.  
 Elementary Mensuration, F. H. Stevens; The MacMillan Co.  
 Science and Mathematics Magazine, Smith & Turton; Mount Morris, Morris, Ill.  
 Elements of Mechanics, M. Merrimen; John Wiley & Sons.  
 Shop Problems in Mathematics, Beckenridge; Ginn & Co.  
 Mathematical Recreations and Problems, Ball; The MacMillan Co.  
 Exercises in Factoring; D. C. Heath & Co.  
 The Teaching of Geometry, David Eugene Smith; Ginn & Co.

## MUSIC

In the high school the study of music should be broadened out beyond the study of technical phases of the subject or the incidental singing of songs. Music should lead to the knowledge, appreciation, interpretation, and rendering of some of the best things in the field of music expression.

The providing of special music courses is the latest development in the growth of music in the high school. This affords opportunities for students who are studying music from the professional standpoint and at the same time, it gives a practical course in subjects quite necessary to them as members of a community where some degree of culture and intelligence is essential.

A large number of high schools are offering music courses in one form or another and in most instances are granting credit.

### SUMMARY OF COURSES

COURSES	Recitation 40 minute Periods Weekly	Preparation 40 minute Periods Weekly	Total Time 40 minute Periods	Unit 1 year.	Unit 4 years.
I. Chorus Singing	2	None	2	$\frac{1}{4}$	1
II. Ensemble Glee Club Orchestra Band	2	2	4	$\frac{1}{2}$	2
III. Appreciation	1	1	2	$\frac{1}{4}$	1
IV. Theory of Music Harmony History Sight-Singing and Ear-Training	2	2	4	$\frac{1}{2}$	2
V. Applied Music Voice, Piano, Pipe-Organ Symphonic Instruments	One 30 Minute Period	Seven 60 Minute Hours Weekly	7 $\frac{1}{2}$ Hours	1	4

Any of the above courses may be elected by students who desire to major in Music, with the intention of making it their life work. Other students may elect only courses I, II and III. If such students elect all of these three courses they must have at least sixteen units of credit for graduation.

**Course I—Chorus Singing:**

Two periods a week and a public program once a year. One-fourth unit per year. If possible, the songs and choruses studied should be graded beginning with simple unison and four-part songs and progressing to more difficult choruses and cantatas. At least, one cantata should be performed annually in public.

There are many reasons why good cantatas and part songs should be studied. By singing this type of music the student's ability to appreciate the best in music gradually increases and through him the taste at home is improved then finally the community.

Through the use of good choral music, the student develops an ability to use his voice properly and to discriminate between the great and less important works. The music of the high school ought to function directly into the community. What will do that better than the master choral works, good part songs and cantatas? Every voice in the chorus should be tested individually and assigned to a regular part. The plan of individual singing that is so often used in the grade school should be followed to some extent in the high schools.

The principal aim of all work in both the grades and the high school is Education and chorus work should be a combination of hard work and recreational singing.

**Course II—Ensemble:**

Two periods weekly amounting to one-half unit per year. The students should also appear at school assembly and occasional public programs.

Students of symphonic instruments who apply for outside credit should be required to play in the orchestra. Piano students should be required to act as accompanists when needed and voice students required to attend Glee Club rehearsals regularly.

**Course III—Appreciation:**

One period a week with outside reading in Music History. One-fourth unit a year. This course is offered to students without previous technical work, as the aim of this course is to develop a love for good music and more intelligent music listeners. Students should be made familiar with the World's folk music vocal and instrumental forms. Study selections from Oratorios and Operas and Symphonies. The study of the different types of voices and combinations of the Symphonic instruments should be included in this course. The more advanced students in applied music, the orchestra and the phonograph should be used in presenting this course.

**Course IV—Theory of Music:**

**Harmony, History, Sight-Singing, and Ear Training:** Two prepared recitations a week. When taken alone, one-half unit a year. This course should be required of all students planning to follow music as a profession and who elect music as a major subject.

**Course V—Applied Music:**

**Voice, Piano, Pipe Organ, and Symphonic Instruments:** One lesson a week and seven hours practice is required. One credit will be given for one year's work. Each student must take one 30 minute lesson a week for each thirty-six weeks of the school year, from a teacher of music, holding a valid vocational certificate of Music from the Department of Public Instruction. Practice seven hours a week, appear at any entertainment given by school authorities, when requested. Pupils in these subjects must pass an examination upon beginning their work and at the end of each semester. This examination to be given by the Supervisor of Music or teacher of High School music. Lessons or practice omitted must be made up before credit is granted.

The parent or guardian of a pupil must make application upon blank forms prescribed by the schools for the granting of music credit for private study. Monthly reports must be made to the Director of Music or to the High School principal, signed by the parent stating the number of practice hours, and signed by the instructor stating satisfactory recitations. At the end of each semester the private teacher of music must report upon blanks provided, the number of lessons taken, the length of each lesson, the pupils progress, the compositions and exercises studied, and such other information as may be requested to aid in determining the musical scholarship of the student and the testing of his work.

#### **Assembly Music:**

At least one-half hour each week should be spent in ensemble singing under the leadership of the special teacher of music or of any other teacher possessing ability as a song leader. Assembly singing is not chorus work as voices are not tested. A definite program should be prepared in advance, the music should be carefully selected and rehearsed with the leader and pianist. In school which have glee club and orchestra organizations, the assembly period will afford an opportunity for public performance by these organizations, and for the rendering of a valuable service to the school. These organizations should be given a place occasionally on the program for special numbers.

#### **Suggested List of Two, Three, and Four Part Music for High Schools.**

##### **Two Part Songs**

'Tis the Hour for Music, Farmer; Birchard & Co., Boston.  
Swing Song, Lohr; Birchard & Co., Boston.  
The Angel, A Rubinstein; Schirmer, N. Y.  
Toreadors, Bizet; Schirmer, N. Y.  
Sing On, Denza; Schirmer, N. Y.

##### **Three Part Songs**

Lullaby, Brahms; C. C. Birchard, Boston.  
Welcome, Pretty Primrose, Pinsuti; C. C. Birchard, Boston.  
Maria, Mari, Di Capua; C. C. Birchard; Boston.  
Chit-Chat, Moffat; C. C. Birchard, Boston.  
Song of the Mill Stream, Adams; Birchard & Co., Boston.  
Amaryllis, Parlow; Birchard & Co., Boston.  
Woodland Breezes, Weiser; Schmidt, N. Y.  
The Nights, Roberti; Ginn & Co., Chicago.  
Blue Danube Waltz, Strauss; Schirmer, N. Y.  
The Happy Miller, Veazie; Ginn & Co., Chicago.  
Will O' the Wisp, Cherry; Ginn & Co., Chicago.  
Esmeralda, Levey; J. S. Fearis & Co., Chicago.  
Lullaby from "Jocelyn" Godard; Schirmer, N. Y.  
Snow Flakes, Cowen; Schirmer, N. Y.  
Our High School, Miessner; Schirmer, N. Y.  
Wake, Miss Lindy, Warner; Schmidt, N. Y.  
The Girl with the Curl, Fearis; J. S. Fearis & Co., Chicago.  
Rock-a-by Lady, Prescott; Birchard & Co., Chicago.  
Come Sweet Morning, Matthews; Ricordi, N. Y.  
Strauss Waltz-Song, arr Harris; Schirmer, N. Y.  
The Owl and the Pussy Cat, Ingram; Schirmer, N. Y.  
Lift Thine Eyes, Mendelssohn; Schirmer, N. Y.  
Morning Invocation, D. Buck; Schirmer, N. Y.  
Evening Hymn, D. Buck; Schirmer, N. Y.  
Autumn, S. S. A. A. Gaynor; Clayton F. Summy, Chicago.

**Four Part Music**

Away to the Fields, Wilson; J. S. Fearis & Co., Chicago.  
 The Call to Arms, Veazie; Ginn & Co., Chicago.  
 Who Will Come With Me?, Gluck; Ginn & Co., Chicago.  
 The Kerry Dance, Molloy; Ginn & Co., Chicago.  
 The Red Scarf, Veazie; Ginn & Co., Chicago.  
 America Triumphant, Demarest.... Fearis & Co., Chicago.  
 Away, Away at Break of Day, Gingrich; Fearis & Co., Chicago.  
 Singing to You, Old High, Parks; Fearis & Co., Chicago.  
 The Sailor's Dance, Molloy; Ginn & Co., Chicago.  
 Bridal Chorus, Cowen; Ginn & Co., Chicago.  
 Oh, Italia, Italia, Beloved, Donizetti; John Church & Co., N. Y.  
 The Silent Sea, Neidlinger; Schirmer, N. Y.

**Books for Boy's Glee**

Laurell Glee Book, C. C. Birchard, Boston.  
 Part Songs, Meyers; American Book Co., Chicago.  
 Ruff Stuff Songs, C. C. Birchard, Boston.  
 Appolo Song Book, Ginn & Co., Chicago.

**Part Songs**

On the Sunny Side, Nyvall; Fearis & Co., Chicago.  
 The Barks, Hastings; Schirmer, N. Y.  
 A Ford Song, A Fliver; G. Schirmer, N. Y.  
 Home Again With You, Logan.  
 Over the Morning Sea, Wilson; Fearis & Co. Chicago.  
 Old Farmer Slow, Geibel; Fearis & Co., Chicago.  
 Flags of the Stars, Fearis; Fearis & Co., Chicago.  
 Topical Song, Howley, Schirmer, N. Y.  
 Tinkers' Song, De Koven; Schirmer, N. Y.

**High School Operettas**

Captain of Plymouth, Mixed; C. C. Birchard & Co., Chicago.  
 Sylvia, Mixed; C. C. Birchard & Co. Chicago.  
 Nautical Knot, Mixed; C. C. Birchard & Co. Chicago.  
 Bulbul, Mixed; C. C. Birchard & Co., Chicago.  
 The Bosns Bride, Mixed; C. C. Birchard & Co., Chicago.  
 The Japanese Girl, H. S. Girls; C. C. Birchard & Co., Chicago.  
 Pinafore, Mixed; C. C. Birchard & Co., Chicago.  
 Chimes of Normandy, Mixed; C. C. Birchard & Co., Chicago.  
 Little Tycoon, Mixed; C. C. Birchard & Co., Chicago.  
 Mikado, Mixed; C. C. Birchard, Chicago.  
 The Pennant, Mixed—Foot Ball Operetta; C. C. Birchard & Co.  
 Princess Chrysanthemum, Unison and two Part; C. C. Birchard & Co., Chicago.  
 Feast of Red Corn, Unison and two Part, C. C. Birchard & Co.  
 The Maid and the Middy, Mixed; C. C. Birchard & Co., Chicago.  
 Little Lycoon, Mixed; C. C. Birchard & Co., Chicago.  
 Cherry Blossoms, Mixed; C. C. Birchard & Co., Chicago.  
 Yanki Sun, H. S. Girls; C. C. Birchard & Co., Chicago.  
 Pirates of Penzance, Mixed; C. C. Birchard & Co., Chicago.

**High School Cantatas**

Pied Piper of Hamelin, Two Parts; Educational Bureau Co., Chicago.  
 Pan on a Summer Day, Three Parts; Educational Bureau Co., Chicago.  
 Legend of Nacoochie, Three Parts; Educational Bureau Co., Chicago.  
 A Day in Roseland, H. S. Girls; Educational Bureau Co., Chicago

- King Rene's Daughter, H. S. Girls; Educational Bureau Co., Chicago.  
 Melusina Mixed; Educational Bureau Co., Chicago.  
 Erl King Daughter, Mixed; Educational Bureau Co., Chicago.  
 Mound Builders, Sop. Alto and Bass; Educational Bureau Co., Chicago.  
 Feast of Little Lanterns, H. S. Girls; Educational Bureau Co., Chicago.  
 Hiawatha, Mixed; Educational Bureau Co., Chicago.  
 Wreck of the Hesperus, Mixed; Educational Bureau Co., Chicago.

### List of Orchestra Music

#### Full Orchestra:

- |                     |                               |
|---------------------|-------------------------------|
| Grade I—Easy        | Grade II—Moderately difficult |
| Grade III—Difficult |                               |
1. March—Pomp and Circumstances, No. 182—Elgar, Grade 3  
 Selection—Madam Butterfly—arr Godfrey—Grade 3. Boosey  
 & Company, New York.
  2. The Imperial Concert Collection—Grade II. John Church  
 Co., Cincinnati.
  3. Fantasia—Campus Echoes—Rollinson—Grade 2.  
 Overture—Folies of Cupid—Gruenwald—Grade 1.  
 Novellete—Springtime—Atherton—Grade 1.  
 Amateur Orchestra Folio—Grade 2.  
 Oliver Ditsan Co., Boston.
  4. Grand America Fantasia—America Forever—Fobani—Grade  
 3.  
 Moment Musical—Shenbery—Grade 2.  
 March—Flag Day—Schramm—Grade 2.  
 Pizzicotti Polka from Sylvia—Delibes—Grade 3.  
 Pantasia Gems from Stephen Foster—Grade 2.  
 Album Leaf—Wagner—Grade 2.  
 Carl Fischer, New York.
  5. Idyll—Mill in the Forest—Grade 2.  
 Amateur Orchestra Journal Vols III, V, and II—Grade 2.  
 Overture—Golden Septre—Grade 2.  
 Peerless Beginners Orchestra Book—Grade 1.  
 March—Millitarie—Schubert—Grade 3.  
 Carl Fischer, New York.
  6. Jenkins Beginners Orchestra Books—Grade 1 and 2.  
 Jenkins & Son, Kansas City, Mo.
  7. Intermezzo—Cavalleria Rusticana—Grade 1.  
 Selections—The Merry Widow—Grade 1.  
 March—The New Ideal—Grade 2.  
 Waltzes—L' Edyudiantina—Grade 2.  
 Medley—Gems from the Overtures—Grade 3.  
 J. W. Pepper & Son, Philadelphia, Pa.
  8. Old Glory—National Air—Seredy—Grade 1.  
 Selection William Tell—Rossini—Grade 1.  
 Barcarolle—Tales of Hoffman—Offenbach—Grade 1.  
 Selections on Southern Airs—Seredy—Grade 1.

## NATURAL SCIENCES

### BIOLOGY

(One Unit)

It is neither possible nor desirable to have uniform courses of biology in the different schools of the state. Decided variations in courses must necessarily occur because of the great differences in the training and experience of teachers, in the extent and kind of equipment, in the character of the local fauna and flora, and in the general attitude of pupils due to either urban or rural home environment.

1. Aims. All courses in biology should have certain well defined aims. The main ones of these may be stated as follows:

1. To develop the scientific attitude of mind. This includes among other things to seek knowledge at first hand, to observe correctly, discriminate sharply between essentials and non-essentials, compare carefully, record findings accurately and draw only well-founded conclusions. For this purpose courses in biology are admirably adapted. The back-bone of the course is the study of living organisms in nature and in the laboratory under experimental conditions where the whole procedure should be an application of the principles of the scientific method.

2. To present those biological facts and principles which will best enable the pupils to realize such educational objectives as "health, worthy home membership, vocation, citizenship, the worthy use of leisure, and ethical character." This is only making effective the principle that the purpose of secondary education is to teach boys and girls rather than subjects.

- (a) Health—The fundamental life processes in plants and animals are mainly alike. The knowledge of these obtained in biological courses are largely directly applicable to human beings and should be so presented. Likewise, a knowledge of the life history of plants and animals parasitic upon man will do wonders in securing prevention of disease in the individual and will create the attitude of mind which will support all intelligent efforts along the line of sanitation and public health regulations.
- (b) Worthy Home Membership—To this biology should contribute by developing, among other things, an interest in the planting of trees, shrubs and flowers on the lawn around the home, and in the cultivation of appropriate flowers inside the house, and by encouraging song birds and other birds to nest in the trees around the home.
- (c) Vocation—The biological courses of the high school cannot prepare for any vocation, but they can create interest in, and point the way to, the many vocations which have their beginnings in biology, such as agriculture, medicine, forestry, horticulture, floriculture, animal and plant breeding, public health work, and teaching and research in the various fields of biology.
- (d) Citizenship—The course should develop an appreciation of the work done by the great workers in biology and of their great sacrifices and privations in reaching their results,

and thus demonstrate to the pupils the value of intensive study of biological sciences as means through which scientific progress is attained. In the degree to which this is done, will the methods and results of the work of the biologist be reflected in intelligent thought and action on the part of those so trained.

- (e) The worthy use of leisure—Development along this line is especially needed in our times. Courses in biology are especially adapted for this purpose. Properly presented they may call forth a response to the esthetic appeal of plants and animals, and create a permanent pleasure-giving interest in the occurrence, life-history, habits and interrelationships of plants and animals. The opportunities offered for a vocational education by these courses are almost without number.
- (f) Ethical character—Biological courses demonstrate concretely the principle that all living organisms are subject to the great laws of nature. Effect follows cause with never-failing certainty. Only inside the limits of these laws can organisms thrive and prosper. Human beings must likewise live their lives in accordance with them. The significance of sex and the facts of heredity are best mastered in connection with courses in biology, and this knowledge should bring home the duties and obligations which individuals owe to the welfare of unborn generations. Duty and responsibility can nowhere be more strongly emphasized. Stated in other words these educational objectives are only different forms of the adjustment and adaptations which human beings are called upon to make. And since so large a part of biology deals with adjustment and adaptations to organisms to their environment, it follows that its study should be made to aid the pupils in their life adjustment, while retaining the power of making new adjustment, which is one of the principal purposes of life and education.

3. To secure a bird's eye view of the animal or plant kingdom through first-hand knowledge of typical specimens of their main subdivisions. This will bring home to the pupil the gradually increasing complexity of organization and the wonderful unity in the midst of variety which characterizes living organisms.

4. To point out the material and economic values of animals and plants.

5. To give some training in the use of manuals for classifying plants and animals. The text books and manuals should be selected on the basis of being best adapted to the realization of the aims indicated above.

II. Methods. Naturally the methods will vary somewhat with the environment of the school. But in all schools there should be field work, laboratory work, text-book assignments, collateral reading, quizzes, and possibly a limited amount of lectures.

There should be definiteness to the field work. The teacher should know beforehand the material which is likely to be available and the specific objects to be accomplished.

Likewise the work in the laboratory must be well planned. It should have a definite purpose, and everything connected with it should be so arranged as to waste no time. Intricate experiments, difficult to understand, and detailed high power microscopic work should be reduced to a minimum. Drawings should not be considered an end in themselves, but should serve mainly to secure accuracy and correctness in observance. Accuracy, neatness and legibility in labeling should be insisted on.

Complete and detailed study should be made of the type specimens while allied forms may be studied in less detail, but more from a view of comparison with the type form. Comparisons should also be made to bring out similarities as well as differences existing between the type specimens representing the different groups and thus work out at first-hand the distinguishing characteristics of the groups.

III. Point of View—The point of view from which the subject matter is presented is of great importance. The pupil should not be made to feel that one day or one week he is studying morphology, physiology, or ecology as ends in themselves. As far as possible, he should be impressed with the idea that he is studying **living organisms** whose main purpose of existence is to maintain themselves and provide for the race; that self-maintenance and reproduction involve a number of difference kinds of activities such as those which are usually included under the term physiology in the narrower sense, and in addition several others such as overcoming physical environment difficulties, competition with its fellows for space and food, struggle with natural enemies which must be met by offense, defense or flight—all classed under the term ecology; that for the performance of all these different functions plants and animals must have organs or structures adapted to carry on this work. Thus physiology and ecology are the dynamic phase and morphology the static phase of the same life process—the process of adjustment and adaptation in the maintenance and propagation of living organisms.

From this point of view it naturally follows that the practical work in field and laboratory should be carried on as far as possible in connection with living specimens. In this way it will be possible to interrogate nature by the formulation of problems for solution, in other words, the course will be experimental as well as observational, and thus become an ideal in developing the scientific attitude of mind. It would also follow that the organisms studied must be largely those which occur in the school environment, or can readily be secured in the living condition. Forms which can only be studied in the preserved condition should be few and should be limited to those not found in the locality and which are absolutely necessary in making the birds-eye view possible.

The point of departure for the course is not of vital importance as long as sequence in the presentation is maintained and the unity of the course is not lost. The plan of the text-book selected will probably largely determine the order of presentation.

IV. Contents—The length of the course will largely determine the number of forms which can be considered, and how many of these can be taken up for detailed study.

In botany, there should be more or less detailed consideration of two or more green algae; some pathogenic and non-pathogenic forms of bacteria; one or more of each of parasitic and saprophytic forms of fungi; one liverwort and one moss; one or more of the pteridophytes; one gymnosperm; one monocotyledon and one dicotyledon. In zoology the more detailed consideration should be given to two or more protozoa; one annelid; one crustacean; one insect; and one or more vertebrates. Other forms in these groups should be studied more superficially in a comparative way. Typical specimens of other great groups may be taken up in a more general way, unless there should be time enough for a more thorough study. In Botany the economic values of plants should be pointed out all along the course, and in Zoology the same should be done with reference to animals. And in both subjects, some training should be given in the use of manuals for the determination of species. It is of the

greatest importance that the main facts of heredity be taught in connection with both sciences.

All along the course the facts and principles mastered should be given their proper human applications.

## CHEMISTRY

(One Unit)

### I. CHEMICAL AND PHYSICAL CHANGES.

#### 1. Chemical changes

- (a) Simple decomposition of water: Hydrogen and Oxygen
- (b) Direct combination of Sulphur and Oxygen.
- (c) Combustion: Conditions of—combustible materials, supporter of combustion, kindling temperature.  
Explosive mixtures: matches, dynamite.  
Spontaneous combustion.  
Slow oxidation: rotting, rusting, weathering.

#### 2. Physical changes

- (a) Water: freezing, boiling.
- (b) Solutions: dilute, concentrated, saturated, supersaturated, equilibrium, changes of solvent and solute.
- (c) Purification: boiling, distillation, filtration, crystallization.

### II. THEORY.

- 1. The Molecular Theory: developed from 2a and 2b under I.
  - (a) Atoms, valence. Reducing and Oxidizing agents. Use of simple equations to express what occurs in chemical reactions throughout the course.

### III. NON-METALLIC ELEMENTS AND COMPOUNDS.

- 1. Oxygen. (Learn symbols of common elements and compounds incidentally).
  - (a) Preparation: decomposition of  $\text{KClO}_3$  with  $\text{MnO}_2$  as catalytic agent. Equation.
  - (b) Properties.
    - Physical: color, odor, solubility in water, weight.
    - Chemical: valence, nasency, (Ozone), atomic weight.
- 2. Hydrogen.
  - (a) Preparation: Electrolysis of water and the reaction of dilute  $\text{H}_2\text{SO}_4$  with metallic Zn.
  - (b) Properties.
    - Physical: see oxygen.
    - Chemical: burns in air, reducing agent, valence, atomic weight. Explosive mixtures of O and H—The Hydrogen gun.
  - (c) Uses: oxy-hydrogen flame, military balloons, (compare with helium.)
  - (d) Compounds:  $\text{H}_2\text{O}$  and  $\text{H}_2\text{O}_2$ .
- 3. Nitrogen.
  - (a) Preparation: Burn phosphorus on float in air confined in bell jar until O is exhausted.
  - (b) Properties:
    - Physical: color, odor.
    - Chemical: nasency, relation to combustion, valence, atomic weight.
  - (c) Compounds: ammonia,  $\text{HNO}_3$ ,  $\text{N}_2\text{O}$ . Uses of each.
- 4. Chlorine.
  - (a) Preparation: by reaction of  $\text{HCl}$  with  $\text{MnO}_2$ .
  - (b) Properties: color, odor, weight in comparison with air.
  - (c) Uses: bleaching agent, deodorizer and disinfectant.
  - (d) Compounds:  $\text{HCl}$  and  $\text{NaCl}$ .

5. The Remaining Halogens.
  - (a) Bromine: its nature, properties and uses.
  - (b) Iodine: its nature, properties and uses.
  - (c) Fluorine: its nature, properties and uses.
6. Carbon:
  - (a) Graphite, uses: stove polish, lubricant, lead pencils.
  - (b) Diamond, uses: jewelry, glass cutter, rock drill.
  - (c) Lampblack, use: pigment.
  - (d) Fuel: wood, charcoal, coal, coke, petroleum.
  - (e) Oxides of Carbon.
    - Carbon Monoxide  $\text{CO}$ .
      - Prepared by reducing carbon dioxide.
      - Uses: in fuel gas, in water gas.
      - Physiological effect of breathing  $\text{CO}$ .
    - Carbon Dioxide,  $\text{CO}_2$ .
      - Preparation: burning carbon, reaction of  $\text{HCl}$  with  $\text{CaCO}_3$ .
      - The Lime Water Tests.
      - Uses: in beverages, fire-extinguishers, leavening agent.
  - (f) Decolorizer.
7. Sulphur.
  - (a) occurrence, extraction.
  - (b) Uses: vulcanizing rubber, making matches, sulphur dioxide, hydrogen sulphide, sulphuric acid.
8. Silicon:
  - (a) Occurrence.
  - (b) Forms: quartz, sand, agate, ( $\text{SiO}_2$ ). Other compounds are feldspar, mica, clay.
9. Phosphorus.
  - (a) Occurrence and preparation.
  - (b) Properties: chemical and physical.
  - (c) Handling, and uses, such as matches and vermin exterminators.
10. Acids, Bases and Salts.
  - (a) Definition of acid: a compound which gives up a positive H radical on ionization. (The study of ionization should be done here.
  - (b) Characteristics: sour taste, effect on litmus, usually formed with non-metallic elements. ( $\text{H}_3\text{AsO}_4$ )
  - (c) Definition of base: a compound which gives up a negative OH radical on ionization.
  - (d) Characteristics: brackish taste, effect on litmus, formed with OH negative radical and metallic positive radical.
  - (e) Definition of salt: a compound which gives up neither a positive H nor negative OH upon ionization.
  - (f) Characteristics: Often crystalline solid. Color white, pink, blue and green.
  - (g) Study three type acids:  $\text{H}_2\text{SO}_4$  as the "Father of Acids", commercial importance, production;  $\text{HCl}$ , production and uses;  $\text{HNO}_3$ , how produced, uses. (Other acids should be studied and tests for all of these studied should be done by students preparing for College entrance.)

#### IV. METALLIC ELEMENTS AND COMPOUNDS.

1. Sodium.
  - Compounds: chloride, carbonate, nitrate.
  - Hydroxide, use: neutralization of acids, solvent for fats.

2. Potassium: occurrence, properties, uses.
3. Calcium: compounds are, hydroxide, oxide for mortar, carbonate for building material, making quick lime, flux in iron furnaces, sulphate, in water, hard and soft water, types of softness, how determined, how hard water is softened, phosphate for fertilizers, and bleaching powders for disinfecting and bleaching.
4. Magnesium: occurrence, compounds, preparation, properties.
5. Aluminum: occurrence, properties, preparation, uses.
6. Study the following list of metals with special emphasis on
  - (a) Practical uses and common compounds.
  - (b) Electrolytic processes used in their separation from their compounds.
  - (c) Their commercial production with the chemistry involved in the processes.
  - (d) Chemistry of iron and steel and their alloys.
  - (e) The list of metals.
 

1. Lead	4. Iron	7. Silver
2. Copper	5. Zinc	8. Gold
3. Tin	6. Mercury	9. Platinum
  - (f) The list of alloys.
 

1. Brass	5. Fusible metal (Fire
2. Bronze	6. Sterling
3. Solder	7. Pewter
4. Type metal	8. Gold coin

NOTE: It is recommended that, so far as is possible, those students who are preparing to enter college shall continue the study of metals to the end of the second semester. Qualitative analysis should be introduced. This work, if offered, must be carefully and accurately done. A scientific and yet simple process of qualitative work can be found in "Unknowns" by M. C. White. (Write to Head of the Department of Chemistry, State College, Brookings, S. D. Price of pamphlet is 35c.) Those students who will not enter college should finish the remainder of this outline.

Note: The following list of compounds should be perfectly familiar to the student at the end of his work in METALS. The list is not to be drilled on, but should be mastered as it naturally comes in the study of metals.

Chemical Name.	Common Name.	Formula
Ammonium Chloride	Sal Ammoniac	$\text{NH}_4\text{Cl}$
Calcium Carbonate	Chalk	$\text{CaCO}_3$
Calcium Carbonate	Marble	$\text{CaCO}_3$
Calcium Carbonate	Whiting	$\text{CaCO}_3$
Calcium Oxide	Burnt Lime	$\text{CaO}$
Calcium Oxide	Quick Lime	$\text{CaO}$
Calcium Oxide	Lime	$\text{CaO}$
Calcium Oxide	Unslacked Lime	$\text{CaO}$
Calcium Sulphate	Gypsum	$\text{CaSO}_4$
Calcium Sulphate	Plaster of Paris	$\text{CaSO}_4$
Copper Sulphate	Blue Vitriol	$\text{CuSO}_4$
Copper Sulphate	Copperas (Blue)	$\text{CuSO}_4$
Ferrous Sulphate	Copperas (Green)	$\text{FeSO}_4$
Ferrous Sulphate	Green Vitriol	$\text{FeSO}_4$
Hydrochloric Acid	Muriatic Acid	$\text{HCl}$
Magnesium Hydroxide	Milk of Magnesium	$\text{Mg}(\text{OH})_2$
Magnesium Oxide	Magnesia	$\text{MgO}$
Magnesium Oxide	Epsom Salts	$\text{MgSO}_4$

Potassium Acid Tartrate	Cream of Tartar	$\text{KHC}_4 \text{ H}_4 \text{ O}_6$
Potassium Nitrate	Niter	$\text{KNO}_3$
Sodium Bicarbonate	Baking Soda	$\text{NaHCO}_3$
Sodium Carbonate	Sal Soda	$\text{Na}_2\text{CO}_3$
Sodium Carbonate	Washing Soda	$\text{Na}_2\text{CO}_3$
Sodium Carbonate	Soda	$\text{Na}_2\text{CO}_3$
Sodium Chloride	Salt (table)	$\text{NaCl}$

## V. The Soil.

1. Formation.
2. Kinds.
3. Chemical changes therein.
4. Manures and fertilizers.

## VI. Function and Use of Food in the Body.

1. Carbohydrates: transformed into fat.  
Starch, glucose formation from starch, cane sugar.
2. Protein materials: build and repair tissues.  
Albumin, white of egg, casein, curd of milk, lean meat.
3. Fats and Oils: stored as fat.  
Butter and its substitutes: lard and its substitutes, olive oil, oil of corn and cotton seed, fat of meat.
4. Mineral matter of ash: shares in forming bones and assists in the processes of digestion.
5. Milk: testing, sterilization, pasteurization, products.
6. Methods of food preservation and use of preservatives.
7. Fermentation: fermentation and digestion.
8. Principles of nutrition, correct eating.

## VII. Cleansing Agents and Materials.

1. Soap, polishing soaps, powders, alkalies, washing soda, borax, solvents, boiling in an aluminum dish.

## VIII. Protective Coatings.

1. Hard: tin, tinware, zinc, galvanized iron, nickel, nickel plating.
2. Others: enamel, paints, varnishes.

## IX. Textiles.

1. Typical fibers.
2. Distinguish wool from cotton by sodium hydroxide test.
3. Distinguish real from artificial silk by  $\text{HCl}$  test.
4. Destructive effect of heat on wool.

THE COURSE IN CHEMISTRY should be based on the following:

1. At least thirty experiments by the pupils. (Required)
2. Experiments by the teacher where lack of equipment or nature of the experiment prevents the pupils from doing them.
3. Subject matter as outlined. (Minimum).
4. Adequate apparatus and chemicals with which pupils may work.
5. Excursions for the study of local industries

## List of Suggested Experiments

1. Electrolysis of water.
2. Freezing mixture.
3. Testing water for organic impurities by means of  $\text{KMnO}_4$ .
4. Testing water for chlorides by means of  $\text{AgNO}_3$ .
5. Testing water for ammonia by means of Nessler's Test Solution.
6. Preparation of Oxygen by means of  $\text{KClO}_3$  and  $\text{MnO}_2$ .
7. Testing Oxygen as a supporter of combustion by means of glowing splinter, fine wire, watch spring, glowing charcoal pencil.
8. Preparation of Hydrogen by means of Zn strips and dilute  $\text{H}_2\text{SO}_4$ .

9. Testing Hydrogen for its explosiveness by means of the Hydrogen gun—make gun from gas pipe 1 inch in diameter. Put iron plug in one end. Bore small hole through which mixture is to be fired. Confine two parts H and one part O in gun by means of cork. Apply match to firing hole and note results.

10. Testing Hydrogen for its inflammability by making soap bubbles of Hydrogen. Supply of H must be prepared and confined in gas bag (Bladder from volley ball) which is attached to pipe. Ignite bubbles with small torch (stick with candle attached) AFTER THEY LEAVE PIPE.

11. Soap: its uses in softening water and in testing the hardness (relative) of water.

12. Preparation and testing of nitrogen. (see suggestions in Course). Determine its properties.

13. Ring Test for Nitrates.

14. Carbon dioxide: preparation, test for properties.

15. Sulphur: several forms.

16. Preparation of Chlorine.

17. Preparation of Chlorine water under direction of Instructor.

18. Preparation of HCl.

19. Test products as in 4.

20. Test for Sulphates with  $\text{BaCl}_2$ .

Note: If qualitative analysis is attempted the remainder of the year should be spent in experiments to perfect the students in the technique of that process. The following experiments should, in that case, be disregarded.

21. Soap making.

22. Soils: testing for acids, and vegetation analysis.

23. Formation of glucose from starch.

24. Determination of fats in milk.

25. Fermentation: action of yeast.

26. Stain removal from fabrics.

27. Testing fibers.

28. Testing fire-proofing materials.

29. Solubility, conditions affecting.

30. Iron Compounds—blue prints.

#### Laboratory Suggestions for Chemistry.

1. An experiment may occupy a double period or any part thereof.

2. Orderly arrangement of laboratory equipment and suggestions needed for safety should introduce this work.

3. The notebook may be divided as follows:

(a) Experiments.

(b) Classroom notes and outlines.

(c) Clippings pertaining to the work.

4. The above thirty experiments are suggestive only. Should the Instructor find some others of equal or greater importance he may substitute such instead of any of the experiments in the list.

5. Suggestions for experiments may be had from

(a) Manual No. 1, Experimental Course in Chemistry, Chemical Rubber Co., Cleveland.

(b) Book No. 1, The Fairyland of Chemistry, Nat'l Scientific Supply Co., Cleveland.

(c) Jones' A Laboratory Study of Household Chemistry, Allyn & Bacon.

(d) Dull-Laboratory Exercises in Chemistry, Henry Holt & Company.

(e) Smith-Mess, Exercises in Chemistry, Henry Holt & Co.

- (f) Williams and Whitman's Lab. Exercises in Chemistry, American Book Co.
- (g) Allyn's Elementary Applied Chemistry, Ginn & Co.
- (h) Black's Laboratory Experiments in Chemistry, Macmillan
- (i) Nichol's Manual of Household Chemistry, Ginn & Co.

### CLASSROOM DEVICES

To stimulate the pupils' memory of the properties of some of the unfamiliar substances they are using in the laboratory, the teacher might say, "I am thinking of some substance that you have used in the laboratory." The students then ask questions that can be answered by "yes" and "no," e. g. "Is it a solid?" "Has it color?" This is continued until some pupil identifies the substance. The winner then thinks of some other substance and the game continues. As a drill method on the properties of the chemicals used, this game is very useful.

In learning symbols and formulas, three or four short questions may be written on small cards, which should be placed face down on the desk. The questions should require only definite short answers, e. g., "What is the formula for sulphuric acid?" "What is the name given to the salts of nitric acid?" The first pupil should read the question from his card and call on some pupil volunteering for it. If the person called answers correctly, the card is passed to him and he reads the next question. If the first pupil called fails to answer, two other pupils are asked in turn. If the third fails to respond correctly the pupil who read the question may keep the card. At the end of the period the pupil holding the greatest number of cards has won.

To measure accurately the individual student's knowledge of an assignment, the following devices are very useful:

Twenty question, each of which may be answered in from one to five words, should be read slowly enough to permit the replies to be written at once. These should be marked immediately by the writer or another pupil. The papers may or may not be handed in. Some sort of report of results should be given, e. g., "Those who had 100 raise their hands." Then all who had from ninety to one hundred, etc. This need take but ten minutes for the writing and five for the results, not over 15 minutes in all.

Ten minutes should be allowed for a written lesson, in paragraph form, on any single topic. Some of these may be read at once, or all may be collected and read by the teacher. The best and the worst may then be read to the class at the next period. Whether they should be simply recorded and destroyed or graded and returned, would depend upon the time at the disposal of the teacher for such work.

Five practical questions that require an application of the assignment may be given, e. g., the following on sulphur dioxide and hydrogen sulphide:

"Why do straw hats turn yellow with age?"

"Why does white paint inside a house turn dark?"

"How and why may sulphur be used to put out a fire in a chimney?"

"Why do eggs or mustard discolor a silver spoon?"

"Why do copper ornaments in the house turn black?"

This test should be answered in ten minutes. It may be tried at the beginning of the period after an assignment on the compounds named. The papers may be collected at once, and the questions then answered orally. The lesson may be continued until the last ten minutes and the same test then repeated. The two papers from each student may then be graded on the amount of improvement shown in the second attempt.

### Supplementary Reading

Each student should select and report on one or two topics during the semester. A suggested list follows:

1. The Commercial uses of oxygen.
2. The manufacture of lead pencils
3. Carborundum
4. Commercial uses of compressed air
5. The Electric furnace
6. The mining of sulphur
7. The making of matches
8. Gunpowder
9. Modern explosives
10. Manufacture of ink
11. Dyes and dyeing
12. Paints, oils and varnishes
13. Commercial fertilizers
14. Story of alcohol
15. Story of sugar
16. Patent medicines
17. Headache preparations
18. Food adulteration
19. Uses of sulphuric acid
20. Manufacture of washing soda
21. Manufacture of soap
22. Manufacture of glass
23. Manufacture of cement
24. Manufacture of paper
25. Fixation of nitrogen from air
26. Cotton and linen
27. Silk and wool
28. Photography
29. Refrigeration
30. Bleaching
31. Uses of lime
32. Food and diet
33. Rubber
34. Story of oil
35. Uses of nitric acid

### Textbooks in Chemistry

- McPherson & Henderson, *Chemistry and Its Uses*; Ginn & Co.  
Vivian, *Everyday Chemistry*; American Book Co.  
Willaman, *Vocational Chemistry*; Lippincott.  
Kahlenberg & Hart, *Chemistry and its Relations to Daily Life*; Macmillan Co.  
Ostwald & Morris, *Elementary Modern Chemistry*, Ginn & Co.  
Dull, *Essentials of Modern Chemistry*; Henry Holt Co.  
Brownlee et al., *Chemistry of Common Things*; Allyn & Bacon.  
Black and Conant, *Practical Chemistry*; Macmillan Co.  
Newell, *General Chemistry*; D. C. Heath.  
McPherson & Henderson, *First Course in Chemistry*; Ginn & Co.  
Irvin, Rivett and Tatlock; *Elementary Applied Chemistry*; Ginn & Company.  
Smith's, *Elements of Chemistry*; Century Co.

A directory of publishers may be found in the *Educational Red Book*, and *Bibliography of Agriculture Reference Books*. Published by Division of Agricultural Education, University of California, Berkeley, California, Jan., 1922.

**Manuals for Teachers**

Smith & Hall, The Teachings of Chemistry; Longmans-Green Co., New York.

Godfrey, Elementary Chemistry; Longmans.

Perkins & Lean, Introduction to the Study of Chemistry; MacMillan

Weed, Chemistry in the Home; American Book Co.

**Reference Books for Pupils**

Handbook of Chemistry and Physics, 8th edition; Chemical Rubber Company, Cleveland.

Slosson, Creative Chemistry; Chemical Foundation, N. Y.

Sadtler, Chemistry of Familiar Things; Lippincott.

Snell, Household Chemistry; MacMillan.

Richards & Elliott, Chemistry of Cooking and Cleaning; Whitcomb & Barrows.

Benedict, Chemical Lecture Experiments; Macmillan.

Olsen, Pure Foods; Ginn & Co.

Sherman, Chemistry of Food and Nutrition; Macmillan.

Bailey, Sanitary and Applied Chemistry; MacMillan.

McCollum, The Newer Knowledge of Nutrition; Macmillan.

Bird, Modern Science Reader; MacMillan.

Duncan, Chemistry of Commerce; Barnes.

Duncan, Some Chemical Problems of Today; Barnes.

Duncan, The New Knowledge; Barnes.

Martin, Triumphs and Wonders of Chemistry; Van Nostrand.

Philips, Romance of Modern Chemistry; Lippincott.

Snyder, Chemistry of Soils and Fertilizers; Chemical Publishers.

**Minimum List of Chemical Apparatus**

Table with drawers for individual apparatus.

1 Trip balance and set of weights

2 Thermometers. 10 to 110c

3 Nests of beakers

2 Graduated cylinders. 25 C. C.

2 Conical graduates. 250 c. c.

3 Pkgs. filter paper to fit funnels

6 Florence flasks. 250 c. c.

6 Four ounce bottles, glass stoppers.

6 Hard glass test tubes

2 One liter bottles with glass stopper.

1 Earthen-ware waste jar

2 U Tubes—6 inch and 2 one-hole stoppers to fit.

2 Bunsen burners or alcohol lamp

1 Blast lamp

10 Feet rubber burner tubing.

2 Blowpipes

2 Wing tops for burners

2 Squares thick asbestos board 12x12

2 Iron stands with ring, clamp and Burette clamp

2 Test tube racks

6 Test tube holders

6 Test tube brushes

2 Deflagrating spoons

6 Pieces wire gauze 4x4 inches

12 Rubber stoppers—one hole—to fit 8x1 inch tubes

12 Rubber stoppers—two holes—to fit 8x1 inch tubes

6 Feet rubber tubing to fit glass tubing

4 Iron forceps or crucible tongs

- 1 Gross test tubes 6x3/4 inch
- 6 Crucibles and covers
- 3 Porcelain mortars and pistles
- 6 50mmx50mm Cobalt blue glass
- 1 in platinum wire in glass rod holder—1 per student.



### Visual Instruction

MOTION PICTURES IN TEACHING CHEMISTRY. Film Mag. Sept. 1920. Henry Bollman, 67 W 44th St., New York City, lists the following films:

- The Story of Sulphur
- The Story of the Lucifer Match
- Smoke Rings—third series—Science at Home
- Chemical and Mechanical Experiments. Part 2—Science at Home
- Science of a Soap Bubble
- The Chemistry of Combustion.—Also produced by Educational

Films Corp.

- Tests of Building Construction Material
- Childhood

The University of Wisconsin lists appropriate films under pamphlets entitled "Nature Study and Science Teachings" and also "Home Economics."

Chemical Action: Crystals, Beseler; Educational Film Co., New York City.

Marvels of Crystalization, Chas. F. Herm, 220 W. 42nd St., New York City.

- Pathe Review No. 109, Making of Radium; Pathe
- Pathe Review No. 113, Luminous Radium; Pathe
- Crystals in Formation, S. Kleine
- Asphyxiation Gases, Educational Films Corp.
- How Plaster is Obtained, Beseler
- Liquid Air, Atlas Educational Film Co.
- The Electrolysis of Metals, Educational Films Corp.
- Oxygen, Atlas Educational Film Co.
- Crystals, Atlas Educational Film Company.

See "General Science" division for address of Film Companies and list of free films

### Illustrative Material

Unless indicated, the following material may be had free of charge.

#### CEMENT AND CONCRETE.

1. American Portland Cement Co., 140 S. Dearborn St., Chicago, Illinois.
2. Pacific Portland Cement Co., Pacific Bldg., San Francisco, Calif.
3. Old Portland Cement Co., San Francisco, California.

#### ASBESTOS.

H. W. Johns Manville Co., 201 Clyborn St., Milwaukee.

#### BUTTONS.

German American Button Co., Rochester, New York.

#### Baking Powder.

Royal Baking Powder Co., New York City. Cream of Tartar Exhibit.

#### CEREALS.

Quaker Oats Co., Fort Dodge, Iowa, Pillsbury Flour Co., Minneapolis, Minn.

#### CARBORUNDUM.

Carborundum Company, Niagara, New York.

**COTTON.**

Textile Industries. Chamber of Commerce. Manchester, N. H.

**CHOCOLATE**

Hershey Chocolate Company, Hershey, Pa.

**FERTILIZERS**

Virginia-Carolina Chemical Co., Richmond, Va. Western Meat Company, San Francisco, Calif. Morris Packing Company, Chicago, Illinois. Armour and Company, Chicago, Swift and Company, Chicago, Illinois.

**FIBER.**

American Vulcanized Fiber Co., Wilmington, Del. International Harvester Co., Chicago, Ill. (35 cents)

**OILS.**

New York Lubricating Oil Co., 20th & Minn. St., San Francisco, Calif. Tidewater Oil Co., San Francisco, Calif.

**FLOUR.**

Washburn, Crosby Co., Minneapolis, Minn. The Sperry Flour Company, Stockton, Calif. Russell Milling Co., Minneapolis, Minn.

**PENCILS.**

Eberhard Faber, New York City.

**PETROLEUM**

Standard Oil Co., San Francisco, Calif.

**POSTUM—GRAPE NUTS.**

Postum Cereal Co., Battle Creek, Michigan.

**SILK.**

Nonotuck Silk Co., Florence, Mass. Cheney Silk Co., 7th and Clark Ave., St. Louis, Mo. T. A. Kelleher, Box 82, Washington, D. C.—\$1.75 lg. col.

**SALT.**

Diamond Crystal Salt Co., St. Clair, Mich.  
German Kali Works, Chicago, Ill.

**SOAP.**

Larkin Co., Buffalo, N. Y.  
Java Cocoanut Oil Co., Kansas City, Mo.

**SOILS.**

Bureau of Soils, N. S. D. A., Washington, D. C. (\$1.75)

**THREAD.**

Spool Cotton Company, 315 4th Ave., New York City.

**TUNGSTEN ORE.**

General Electric Co., Schenectady, N. Y.—Fine exhibit.

**WOOL AND YARN.**

National Wool Warehouse & Storage Co., Chicago, Ill. North Star Woolen Mills Co., Minneapolis, Minn.

**WOOD.**

Southern Cypress Ass'n., New Orleans, La.

**BULLETINS.**

Great Fraud Patent Medicines. American Med. Ass'n., Dearborn St., Chicago, Ill.

**Food Comparisons.**

Nat. Dairy Council, 910 S. Michigan, Chicago, Ill.

**Food Value of Dairy Products.**

California Dairy Council. San Francisco, Calif.

**Soil Sense.**

Oliver Chilled Plow Works, San Francisco, California.

**Bibliography**

Garber E., Teaching Chemistry by the Project Method. School Science & Mathematics. May 1921. Send for price lists No's 40 and 46, Superintendent of Documents, Washington, D. C.

# GENERAL SCIENCE

(One Unit—Half Unit.)

## I. The Air and Its Use.

1. Air as a real substance.  
Does air have weight? Calculate weight of air in room. Does air exert pressure? Make a mercurial barometer. Types of barometers, and uses (to indicate height and forecast weather); Suction, force, exhaust, and bicycle pumps; siphon; compressed air; liquid air; balloons; airplanes; football; automobile tires.
2. Air for Fire and Breathing.  
Composition of air: How is the amount of oxygen and carbon dioxide kept constant? Nitrogen: relation to soil fertility and plant life. Helium: its use in balloons. Oxidation; Matches. Oxidation helps us work. The value of deep breathing.
3. Air and health.  
Ventilating the home; dust in the air; cleaning and dusting; contagious disease; prevention and spreading of disease; insects and disease; health officers and school hygiene; how to keep well; antiseptics and germicides; importance of clean methods of handling foods; relation of molds and yeast to man's life.

## II. Water and Its Uses.

1. Water in our homes (see "proposed projects").  
Impurities in water; methods of purifying; city water systems; the home water supply system; water pressure; sewage disposal; the physical states of water; idea of molecules and atoms; cooking food by boiling; water as a solvent; hard and soft water.
2. Water in the air.  
Evaporation; the thermometer; temperature and amount of water vapor in the air; humidity of the air—relation to health; wet and dry bulb thermometers; wind; weather maps; the weather bureau and its importance.
3. Water and the soil.  
The action of water, ice, wind, air, plants, and animals in making soil; physical structure and fertility of the soil; how water rises in the soil; how to save the moisture in the soil; drainage and irrigation; reclaiming desert regions; reclaiming swampy regions; acid soil and how to correct it.

## III. Foods.

1. Plants  
Importance in the life of man; how is plant life carried on? Nitrogen-fixing bacteria; organic and inorganic foods.
2. For the Human Body.  
Classification of foods; how to select foods; tea, coffee and alcoholic drinks; taste and digestibility; why we cook foods; quality and cleanliness; balanced meals according to age, seasons of year and occupation.

### ACCORDING TO AGE

5-10 yrs.	10-20 yrs.	20-30 yrs.
	Breakfast	
Peaches	Prunes	Orange
Milk	Two Eggs	Eggs or Milk
Oatmeal	Oatmeal	Wheat or C Bread
Honey	Milk	Steamed Figs

Lunch		
Milk	Potato	Egg Sandwich
Wheat Bread	W. or C. Bread	Corn Muffins
Corn	Vegetable	Nuts
Egg Custard	Milk	Milk
Dinner		
Peas or Beans	Corn	Vegetable Soup
Potato	Peas	Celery or Lettuce
Cheese	Fish or egg	Potato
Raisins	Bran Gems	Fish or Buttermilk
Bread Pudding	Custard	Ice Cream or Gelatin

## ACCORDING TO SEASON

(Sedentary Workers)

Spring and Summer		Fall and Winter
Breakfast		
Melon, Peaches or Prunes		Grapes or Peaches
Dates or Figs		Oatmeal or Boiled Rice
Nuts or Cream		Cream
Ripe Banana		Eggs or Milk
Egg (whipped)		
Bran		
Lunch		
Pint Buttermilk		Corn Bread
New potato		Butter
Whole Wheat Bread		Buttermilk
Butter		Vegetable Soup
Dinner		
Lettuce and celery		Celery, nuts
Smoked fish		Potato
Cheese and peanut butter		Turnips
Young Carrots as a salad		Baked Beans
Potato (small amount)		Gelatin or Custard
Peaches or Prunes		

## 3. In the home.

Why foods spoil; action of bacteria, molds and yeast on food; yeast as a friend and foe; drying foods; canning; pure food and drug laws; danger in meat; cleanliness in the kitchen.

## IV. The Earth in Relation to Astronomical Bodies.

## 1. The sun and other stars.

Constellations, the north star, and solar system.

## 2. The moon, planets and comets.

Years, seasons, day and night, time, and gravitation.

## V. Protection and Comfort.

## 1. Building our homes.

Choosing, planning, beautifying and constructing the home—the foundation, walls, floors, and roof; materials used in building; brick, concrete, stone, and stucco construction.

## 2. Lighting our homes (see "proposed projects")

Why objects are visible; reflection, refraction, mirrors; use of lens in reading glass, moving-picture machine, stereopticon and microscope; camera; the human eye, over and under illumination and its attending eye strain; candle, kerosene, gas and electric lights; electric cells, conductors and insulators; fuses; switches.

3. Heating our homes.  
Kinds of fuel; radiation, conduction, and convection; the fire-place, stove, and furnace as a heater; hot-air, hot-water, and steam heat; chimneys; refrigeration and its uses; fireless cooker, electric toaster, iron and other appliances.
4. Clothing.  
Purpose of clothing; cotton, linen, wool, and silk; clothes as conductors of heat; perspiration; cooling effect of evaporation; relation of color of clothing and their warmth; water-proof clothes; the action of soap; how to remove stains; clothes moths.

## VI. The Work of the World

1. Machines  
Simple machines; the lever—its mechanical advantages; the crank, axle, pulley, inclined plane, wedge and screw; complex machines—mowers, binders and sewing machines; friction; measure of work.
2. Communication.  
Telegraph; telephone; newspaper; study of electric bell, and its repair; wireless telegraph and telephone; electromagnets; compass and its use; writing and printing; signaling; types of magnets.
3. Transportation.  
On land—locomotive, electric trolley, automobile; on water—steamboat and submarine; by air—airships and airplanes; compare steam and gas engines; parts and working of an electric motor; principle of the dynamo; Archimedes principle.
4. Life upon the earth.  
Reproduction in plants and animals; kinds of pollination; the meaning of heredity, and selection; destroying flies and mosquitoes.
5. "Safety First."  
Cause and prevention of accidents; sinking; taking chances; danger in and about the home; use of gasoline and benzine; dangers outside the home; emergency treatment.

THE COURSE IN GENERAL SCIENCE should be based on the following:

1. Subject matter of value secured from the student's environment which will therefore vary in different localities.
2. Laboratory work (including well-planned excursions followed up in class) in the problem or project form—30 experiments being required.
3. A full time one-year course, offered to ninth grade pupils only.
4. At least two double time weekly periods for laboratory work performed by the pupils themselves.
5. Adequate equipment and reference books.

The work should be simple but fundamental. Abstract formulae are to be avoided. And the presentation of facts and their analysis and correlation should be made from the non-mathematical point of view.

### List of Suggested Experiments

Other topics or projects may be introduced or substituted.

1. Some uses of the vacuum.
2. The Mercury Barometer.
3. Expansion and contraction of solids by temperature.
4. Ventilation and humidity (at home).

5. Hot-water heating systems.
6. Principles of fireless cookers and thermos bottles.
7. Nature of carbon dioxide and its relation to respiration.
8. Comparative study of the elements oxygen and hydrogen.
9. How molds and yeast plants live and grow.
10. Changes in volume when water freezes.
11. What happens when water boils?
12. Effect of evaporation upon temperature.
13. How liquids are transferred by the siphon and lift pump.
14. What determines whether objects float or sink?
15. Individual study of farm machines such as mowers and binders.
16. Comparative results of pulleys and pulley systems (at home)
17. Comparative results of levers (3 horse eveners), wheel and axle.
18. How a flashlight operates, also door bell and telegraph instrument.
19. How is the cost of electricity determined?
20. Permanent magnets and their uses.
21. How does the electric motor and steam engine operate?
22. The ability of soils to hold water.
23. The moon's change in appearance.
24. Preparation of soap and the action of acids and bases.
25. Action of heat and baking powder in baking.
26. The removal of stains.
27. Milk testing and the feeding of farm animals.
28. Variation in ears of corn.
29. What makes soil fertile?
30. How plant roots absorb water.

### Supplementary Reading

Each student should select and report on one or two topics during the semester. A suggested list follows:

- |                              |  |
|------------------------------|--|
| 1. Home insects              | 10. Control of the plant world                           |
| 2. Communication             | 11. Planting a window box                                |
| 3. Metals of my neighborhood | 12. Growing an acre of potatoes                          |
| 4. Electricity in the home   | 13. How life begins                                      |
| 5. Our planets               | 14. Control of animal life                               |
| 6. How to keep clean         | 15. Relative value of asbestos, sawdust and ground cork. |
| 7. Story of River            | (reference:—U. S. Government Pub. S. & R. Catalog.)      |
| 8. The Weather               |  |
| 9. Water for the home        |  |

### Proposed Projects

#### Lighting our Home

1. Natural light in the home.
  - a. Reflection and diffusion of sunlight.
  - b. Arrangement of windows.
  - c. Choice of wallpaper and hangings.
  - d. History of glass, how it is made.  
Ref:—Caldwell and Eikenberry; Van B. and Smith; Hunter and Whitman; Trafton.
2. Artificial light in the home.
  - a. Candles.  
Find conditions needed for a candle to continue burning and study burning of candle. Also special report, "How candles are made." Ref:—Caldwell and E. Van B. and S.; Trafton.

## b. Oil.

Study structure and working of kerosene lamp. Also special reports on "Sources and Method of purifying coal oil." and "Description of oil well." Ref:—Caldwell and E.; Van Buskirk and Smith; Trafton; Clark; Hunter and Whitman.

## c. Electricity.

Visit power plant. How distributed? How do the fuses protect my home? What causes the bulb to give light? Why can I light one lamp without lighting all? Why does pushing a button put out the light? How is the bulb made? Why better illumination from tungsten filament than carbon? How is electricity measured? How may electricity be changed to light? What things conduct and what do not? How are lights connected? Read the meter and compute cost of electricity used.

Ref:—Caldwell & E.; Van B. and Smith; Trafton; S & J; H. & W.

## d. Arc lights.

How does a carbon arc work? See Smith and Jewett.

## 3. Direct and Indirect Lighting.

a. Advantages and disadvantages of each.

b. Relation of light to good eyesight.

c. Requirements for proper artificial lighting.

Ref:—Caldwell and E.; Smith & Jewett; Hunter & Whitman. For laundry, sanitation, beverage, cooking foods, heat carrier.

**Water in Our Homes**

## 1. Uses.

and power.

## 2. Sources: In my community.

Why selected? Is it sufficient in case of exceptionally long draught? If not, what other provisions are made?

## 3. How transferred from source to consumer.

Note reservoirs, basins, standpipes, pumps, filtration plant.

## 4. How purified.

Precaution taken to keep source clean. What are some impurities found in water? What chemicals are used? Why? How efficient is filtration plant considered? Has any outbreak of disease ever been traced to water supply? How often tested? Compare methods of other communities.

## 5. Pressure in mains.

What added pressure does the sandpipe give? Is there sufficient pressure for the outlying districts?

## 6. Special Considerations.

a. Kinds of water and characteristics of each.

Hard and soft water. Influence upon fabrics in washing. Tests for hardness. Action as solvent. Kind in this community.

b. Action upon pipes and vessels.

Materials to use. Power of rusting and erosion.

c. Methods of control.

Faucets, taps, automatic float feeds. Study advantages of the different types. Compute cost of leaky faucet for a month.

**Textbooks in General Science**

Caldwell & Eikenberry, "General Science"; Ginn & Co.

Caldwell, Eikenberry & Green, "Laboratory Problems"; Ginn & Co

Van Buskirk & Smith, "Science of Everyday Life"; Houghton,

Mifflin.

Hodgdon, "Elementary General Science"; Hinds, Hayden & Eldredge.

Hunter & Whitman, "Civic Science in the Home"; American Book Co.

Trafton, "Science of Home and Community"; MacMillan.

Smith and Jewett, "General Science"; MacMillan.

Hunter and Whitman, "Civic Science in the Community"; American Book Company.

Washburn, "Common Science"; World Book Co.

Elhuff, "General Science"; Heath.

Snyder, "Everyday Science"; Allyn and Bacon.

Waekel & Thalman, "A Year in Science"; Row, Peterson & Co.

Barber, "Science for Beginners"; Henry Holt & Co.

Fall, "Science for Beginners"; World Book Co.

Manuals are published for most of these text books.

#### Reference Books for Students

Bond, "Inventions of the Great War."

Collins, "Inventions for Boys."

Collins, "Book of Electricity."

Collins, "Book of Wireless."

Lane, "Triumphs of Science."

Gilmore, "Boys' Book of Astronomy."

Martin, "Friendly Stars."

Mitton, "Book of Stars for Young People."

Proctor, "Giant Sun and his Family."

Pearson, "Bird Study Book."

Rodgers, "Wild Animals Every Child Should Know."

Rodgers, "Trees Every Child Should Know."

Rodgers, "Useful Plants Every Child Should Know."

Smith, "Romance of Aircraft."

Turner, "Air Craft of Today."

Bodmer, "Book of Wonders."

Corbin, "Romance of Submarine Engineering."

Fournier, "Wonders of Physical Science."

Bolton, "Famous Men of Science."

Official Handbook, Boy Scouts of America, Doubleday, Page & Co. "The Barometer as the Foot Rule of the Air" and "The Mountains of Cloudland and Rainfall" 10 cents each, Taylor Instrument Co., Rochester, N. Y. Charts of Automobile, Steamship and Gas Engine (50 cents each) Popular Mechanics. Creative Chemistry, and Bulletins Chemical Foundation, 81 Fulton St., N. Y. Value Compressed Yeast (free), Fleishman Yeast Co., 701 Wash. St. N. Y. City. Monographs B-1, B-2, B-3, B-5, Western Elect. Instrument Co., Newark, N. J.

#### Free Exhibit Material

Aluminum—Aluminum Co. of America, Westminister Bldg, Chicago.

Asbestos—Kearby and Mattison Company, Ambler, Pa.

Baking Powder—Royal, 135 William St., New York City.

Cocoa and Chocolate—Walter Baker Co., Milton, Mass; Hershey Chocolate Co., Hershey Pa.; Walter Lowney Co., Hanover St., Boston,

Coffee—National Coffee Roaster Ass'n. 39 Oldslip, N. Y. (\$1.00)

Cork—Armstrong Cork Co., Pittsburgh, Pa.

Corn Products—Amer. Mrg. Ass'n. of Products from Corn, 208 LaSalle St. Chicago.

Fertilizers—York Chemical Works, York, Pa., or Swift & Co. South St. Paul, Minn.

Flour—Pillsbury Flour Co., Minneapolis, Minn.

Grain—Postum Cereal Co., Battle Creek, Mich., or Quaker Oats Co., Chicago.

Limestone—Indiana Granite, 112 W. Adam St. Chicago.

Paints and Varnish—Sherwin-Williams Co. 611 Canal St. Cleveland, Ohio.

Salt—Worcester Salt Co. 71 Murray St., New York City.

Silk—Belding Brothers & Co., 201 W. Monroe St. Chicago.

Zinc—N. J. Zinc Company, 55 Wall St. New York City.

Watches—Elgin National Watch Co., Elgin, Ill.

Larkin's School Exhibit—Buffalo, N. Y., (35 cents).

Assortment of Elegant food charts—U. S. Dept. of Agri. (\$1.00)

Home Economics States Relations Service. Send for list of mounted material from University School Supply Co., Columbia, Mo. Also "School Set of Seeds", Bureau of Plant Industry, U. S. Dept. of Agri.

Cement—The Atlas Portland Cement Co., New York.

Seeds—Northrup King & Co., Minneapolis, Minn.

Armour Fertilizers Works at Chicago and Sherwin-Williams Co., Chicago also have free exhibits for schools.

Wilson's Meat Charts, c/o Dom. Sci. Dept. Wilson & Co., Chicago.

#### Classroom Devices

To ascertain ability of pupils, early in term, for sectional assignment, the following tests may be given:

TEST NO. I. Fill in blank spaces with the proper word.

1. A——— is used to measure temperature.
2. The year is divided in four———.
3. The force of——— causes objects to fall to the earth.
4. The——— of a plant develops into fruit.
5. Iron is extracted from———.
6. Water freezes at——— degrees Fahrenheit.
7. It is now the——— season in Chile.
8. Gasoline is usually extracted from———.
9. When the sun's light is shut off by the moon an——— occurs.
10. Many diseases are communicated by——— on soiled hands.

TEST NO. II.—If statement is true, underscore "true", if false underscore "false"

1. New moon comes on the first day of each month. True. False.
2. T. N. T. is a much-used explosive. True. False.
3. Electricity is a liquid flowing through wires. True. False.
4. The sun travels around the earth. True. False.
5. Living things are either plants or animals. True. False.
6. Birds go south in winter to raise their young. True. False.
7. Cows have cloven hoofs. True. False.
8. Wireless telegraphy was discovered by Benjamin Franklin. True. False.
9. Wool is grown on a tropical plant. True. False.
10. Worms fall to earth during severe rains. True. False.

TEST NO III.—Write after each the thought suggested:

- |                             |                                  |
|-----------------------------|----------------------------------|
| 1. Sunkist .....            | 13. Vacuum cup .....             |
| 2. Fifty-seven .....        | 14. Lusitania .....              |
| 3. His Master's Voice ..... | 15. It floats .....              |
| 4. Mazda .....              | 16. Chases dirt .....            |
| 5. Skookum .....            | 17. There's a reason .....       |
| 6. Eat-more .....           | 18. Eventually, why not now?.... |
| 7. Peruna .....             | 19. Shot from guns .....         |
| 8. Keds .....               | 20. Hasn't scratched yet .....   |
| 9. Foch .....               | 21. Pershing .....               |
| 10. Overland .....          | 22. Paramount .....              |
| 11. Bolsheviki .....        | 23. Collier's .....              |
| 12. Kryptok .....           | 24. Ever-ready .....             |

The time at the start and again at the finish should be indicated at the top of the front page; together with the name and age of the pupil.

### General Science Equipment

Practically all material needed will be found in the Physics and Chemistry laboratory. An "Erector," "Meccano", "Exchem-co", and "Chemcraft" set are very good for science clubs, and automobile clubs. A minimum list is arranged below.

- 2 beakers pyrex, 250 cc
- 1 battery jar 100x125 mm
- 1 meter stick
- 1 ringstand, 2 rings
- 1 glass plate 4x4 inches
- 1 bar magnet
- 1 compass, magnetic
- 12 feet rubber tubing, 3/16 inch
- 2 lbs. glass tubing, 5 to 7 mm
- 1 lb. iron filings
- 2 pkgs. blue and red litmus paper
- 1 box candles
- 1 lb. copper wire, insulated
- 48 test tubes 5x5/8
- 12 corks, assorted
- 12 test tubes 8x1 in.
- 1 triple scale
- 1 set weights, iron, 10-500 g.
- 1 burdette clamp
- 1 force pump, glass model
- 2 pulleys, single and double
- 1 bell jar
- 1 barometer tube and pipette
- 1 electric bell, 2 1/2 in. gong
- 2 push buttons
- 1 test tube holder
- 1 thistle tube
- 1 mirror, plane, 4x15 cm
- 12 bottles, wide mouth 8 oz.
- 1 alcohol lamp, 4 oz. or Bunsen Burners
- 3 ft. rubber tubing 1/4 inch
- 1 rubber stopper, 2-hole
- 2 flasks, pyrex, 500 cc
- 1 lb. nitric, and hydrochloric acid
- 1 lb. sulphuric acid
- 1 lb. copper sulphate
- 4 oz. Fehlings sol. "A" and "B"
- 4 oz. oxalic acid, crystals
- 1 lb. manganese dioxide and marble chips
- 1 lb. sulphur and potassium chlorate
- 3 clamp holders
- 1 graduate, cylindrical, 100 cc
- 1 lift pump, glass model
- 1 air pump, vacuum and pressure
- 6 feet rubber tubing 1/4 inch
- 1 Washington collection rocks and mineral
- 1 pound mercury and mercury well
- 4 dry cells
- 1 telegraph set

### Visual Instruction

Many industrial and commercial companies have motion picture films of educational value, which they are willing to loan free of charge to schools. A splendid classified list of such films may be had by writing to the Bureau of Education, Washington D. C. for the "Extension Leaflet No. 2" entitled "Films in Possession of Associations, Commercial and Manufacturing Companies." Another list may be found in the Educational Red Book.

#### Film Distributors and Their Nearest Exchange

Associated First National Pictures, Inc., Des Moines, Ia., 326 Iowa Bldg.

Atlas Educational Film Co., Oak Park, Ill., 1111 South Blvd.

Bureau of Commercial Economics, Washington, D. C.

Beseler Educational Film Co., New York City, 71 W. 23rd St.

Carter Cinema Co., New York City, 220 W. 42nd St.

Community Motion Picture Bureau, Chicago, Ill., 5 S. Wabash Ave.

Educational Films Corp. of America, Minneapolis, Minn., Loeb Arcade.

Educational Motion Picture Bureau, Boston, Mass., 308 Boylston.

Educational Pictures Co., Chicago, Ill., 406 Englewood Ave.

Equitable Film Corp., Kansas City, Mo., 928 Main St.

Famous Lasky Players Corp., Minneapolis, Minn., 601 N. First Ave.

Exhibitors Mutual Dist. Corp., New York City, 1600 Broadway.

First National Exhibitors, New York City, 6 W. 48th St.

First National Exchange, Ltd., Vancouver, B. C., Standard Bank Bldg.

Fox Film Corporation, Minneapolis, Minn., 608 First Ave. N.

General Film Company, New York City, 25 W. 44th St.

Goldwyn Distributing Corp., Minneapolis, Minn., 16 N. Fourth St.

Goldwyn-Ford, Minneapolis, Minn., 16 N. Fourth St.

International Church Film Corp., New York City, 920 Broadway.

Kineto Company of America, New York City, 71 W. 23rd St.

George Kleine, Chicago, Ill., 63 E. Adams St.

Lea-Bel Company, Chicago, Ill., 64 W. Randolph St.

Metro Pictures Corp., Minneapolis, Minn., Produce Exchange Bldg.

New Era Film Co., Chicago, Ill., 207 S. Wabash Ave.

Pathe, Inc., Minneapolis, Minn., 608 First Ave. N.

Red Cross Travel Series, American Red Cross, New York City.

Robertson-Cole Dist. Corp., Minneapolis, Minn., 309 Loeb Arcade Bldg.

Triangle Film Corp., New York City, 1457 Broadway.

United Artists Corp., Minneapolis, Minn., 420 Film Exchange Bldg.

Universal Film Exchange, Minneapolis, Minn., 721 Third Street.

Vitagraph Exchange, Minneapolis, Minn., 608 First Ave. N.

World Film Corp., New York City, 71 W. 23rd St.

Y. M. C. A. Motion Picture Bureau, New York City, 347 Madison Ave.

Y. W. C. A. of the United States of America, New York City, 600 Lexington Ave.

An extended list classifying the number of reels available for distribution by the State Universities of the country, will be found in the reference book entitled "1001 Films" compiled by the Motion Picture Age, Chicago, Ill. This booklet also classifies the films listed. A very complete classification of film subjects may be found in the "Loose-Leaf Catalog and Information Service" published by the Educational Film Magazine, 33 West 42nd Street, New York City.

Additional film companies are listed in the Educational Red Book published by C. F. Williams & Sons Inc., Albany, New York.

The United Projector & Film Corp., 67 W. Mohawk St., Buffalo, N. Y., publishes a general science course hand-book of motion picture films.

For suggested films in general science see "Chemistry" and "Physics" divisions.

A handbook of general information entitled "Motion Pictures and Motion Picture Equipment" is published by the U. S. Bureau of Education. Bulletin, 1919, No. 82.

### Magazines

For Pupils:

The Illustrated World.

Scientific American and Supplement.

Literary Digest.

Popular Science Monthly.

(The Teacher's Service Sheets furnished with each issue are very valuable.)

The above mentioned should be available in every high school.

American Boy.

Boy's Life (Boy Scout Magazine.)

Boys' Magazine.

Popular Mechanics.

Science & Invention (formerly The Electrical Experimenter).

Scientific Monthly.

For Teachers:

General Science Quarterly.

School Science and Mathematics.

American Journal of Science.

Classified list of all American periodicals, giving subscription prices, may be procured from the Moore-Cottrell Subscription Agency, North Cohocton, New York; The J. M. Hanson-Bennett Magazine Agency, Jackson Blvd., Chicago; The A. W. Rundquist Company, West Lake Street, Minneapolis, Minnesota.

### Bibliography

Moore, J. C. Project Science, Progressive. Sch. Sci. & Math., Nov. 1916.

Stevenson, J. A. Project in Science Teaching. Sch. Sci. & Math. Jan., 1919.

Trafton, G. H. Project Teaching in General Science. Sch. Sci. & Math., April, 1921.

Wade, E. G. Utilization of the Chance Project in Science. Sch. Sci. & Math. December, 1920.

Wake, W. S. Project Method in General Science. Sch. Sci. & Math. October, 1919.

Woodhull, J. F. Project Method in Teaching Science, Sch. & Soc. Jan. 13, 1918.

Woodhull, J. F. Projects in Science. Teach. Co. Rec. 17:31, 1916.

Woodhull, J. F. Science Teaching by Projects. Sch. Sci. & Math. 15:225, 1915.

Com. Report. Reorganization of Science in Secondary Schools. Bulletin No. 26, 1920. U. S. Bureau of Education.

Loomis & Carr. A course in Gen. Sci. for vocational home economics schools. General Science Quarterly, November, 1921.

Webb, H. A. Gen. Sci. instruction in the grades. Bulletin No. 4, George Peabody College for Teachers, Nashville, Tenn.

Price List No. 48 and 42. Superintendent of Documents, Washington, D. C.

Send for the "Record of Current Educational Publications" issued monthly by the U. S. Bureau of Education, Library Division.

**PHYSICS SYLLABUS**

(One unit)

**CONTENT OF THE COURSE****I. MECHANICS**

Properties and classification of matter:

**1. Solids.**

- (a) Practical illustrations to define work and unit for measuring work (foot-pound). Force and methods of measuring force. See "Introductory Lesson."
- (b) Composition and resolution of forces: traveling crane, child pulling sled or cart, the pendulum.
- (c) Simple machines. Inclined plane; jack-screw, wedge, practical hauling. Lever: parts and application in whipple-tree, block and tackle (pulley), eveners, wheel and axle, effect of size of wagon wheel upon pull required. Efficiency: measure work in and work out. Distinction between mechanical advantage and efficiency; power; friction, laws of friction; hot-boxes.
- (d) Study of moments. Derived from discussion of levers. Visits to local machine shops, foundries and power plants will clinch a practical application of machines and their work.
- (e) Mechanical energy.
- (f) Stability. Introduced by "Tumble Jack", "Ballast in a Ship". Center of gravity and means of increasing stability.
- (g) Laws of universal gravitation, inertia, action and reaction, momentum.

**2. Fluids.**

- (a) Pressure due to gravity. Atmospheric: barometer, principle as applied in suction, milking machines and breathing. Liquids: water-supply, artesian wells, force pump, gravity system in community, siphon.
- (b) Boyle's Law: air pump, bicycle pump, tires, basketball, football.
- (c) Archimedes' principle: buoyancy, submarines, balloons, airplanes, boats, density, volume of irregular body.
- (d) Pascal's law: hydraulic elevator, hydraulic press, barbers' chairs.
- (e) Molecular forces: capillarity, absorption of gases (illustrated by lamp wicks and ammonia fountain).
- (f) Application of work principle to flowing liquids under pressure.

**II. HEAT**

- 1. Study of school heating system. (See "Heating System of High School.") This will lead to methods of heat transference which should be found by visiting different heating plants in the community. Units of measuring heat may be introduced by asking "which gives more heat, a pound of wood or a pound of coal?" "Here heat must be measured, but how?" This leads to a discussion of thermometers, testing accuracy of thermometers, absolute zero, Charles' Law.
- 2. Problems of ice manufacture, refrigeration, distillation of water and petroleum, formation of dew, rain, hail, snow, and frost, will lead to vaporization in its various forms, "Heat of Vaporization" and "Heat of Fusion."
- 3. Specific heat. Expansion due to heat. Effect on railway rails.
- 4. Heat and work. Study steam and gas engines.

5. Mechanical equivalent of heat.
6. Heat a form of energy, transformation of energy, conservation of energy.

### III. ELECTRICITY.

Approach may be made by taking up the fundamental principles of electricity and magnetism first, if desired.

1. Study the electric bell and telegraph. This will develop a study of complete circuits, cells, kinds of cells with their weak and strong points, methods of connecting them, electro-magnets and the earth's magnetism.
2. Lighting effects of a current. If a storage plant or power plant is not available improvise a miniature electric lighting plant with dry cells and three 3-volt lamps.
4. Heating effects of a current. From the lighting and heating effects derive the idea of resistance and E. M. F., and units for measuring these (ohm and volt).
5. Chemical effect of a current.
  - (a) Storage cell—lead type only, electro-plating. From this derive the idea of current and unit for measuring it. (ampere).
6. Relation of volt, ohm and ampere. (Ohm's law.)
7. Cost of operating modern electric appliances—lights, iron, vacuum cleaner, emersion heater and percolator and others.
8. Magnetic effect of a current resulting in rotation, voltmeter, ammeter and motor.
9. Methods of producing current other than the cell. Necessity for other methods. Dynamo and induction coil. Laws of induced currents.
10. Transformers and telephones. Visit the local plant and central telephone office.
11. Brief survey of static electricity, the electrophorns, lightning rods and also a study of wireless.

### IV. SOUND.

1. Study the phonograph and other familiar instruments.
2. Distinction between musical sound and noise: pitch, speed of sound and medium.
3. Simple and complex wave motion; relation of frequency; wave length and velocity. Amplitude, loudness, interference, beats, discord.
4. Properties of vibrating strings and of air columns.
5. Resonance and reflection, acoustics.
6. Music: scales, fundamentals and overtones.

### V. LIGHT.

1. Study the pin hole camera and human eye. This leads to discussion of image formation.
2. Rectilinear propagation of light, photometry, illumination, intensity.
3. Formation of images by lens as in the eye and camera. Use of lens in correcting faulty eyesight. Combination of lenses in microscope, telescope.
4. Refraction and reflection.
5. Color: Introduce by throwing the spectrum on a screen and holding pieces of colored cloth in different parts of spectrum. Another way is to ask "Why is it so hard to match colors by artificial light?" Another way is to burn in a dark room, a little alcohol to which some salt has been added and notice the effect of the sodium flame upon the skin.

6. Colors and pigments: Theory of color vision—rainbows and halos. Students who expect to enter college should be required to spend the last few weeks discussing topics required for College entrance that have not been included in this course.

The course in physics should be based on the following:

1. Laboratory work preferably in the problem or project form—36 exp. being required, 50 exp. regarded as the maximum.
2. The opportunity to consult other scientific literature, with encouragement to do so.
3. Lecture table demonstrations to illustrate the facts and phenomena of physics in their qualitative aspects and practical applications.
4. Common applications to the everyday life situations of the students and their problems of environment.
5. The topics as outlined, but arranged to follow the psychological order as it reveals itself in the natural working of the students' minds.

The work should be simple but fundamental. The development of abstract formulae should be avoided. The presentation of facts and their analysis and correlation should be kept within the mathematical ability of the students.

### Introductory Lesson in Physics

Ask each member of the class to write on a slip of paper what he considers is a good example of work. Make a blackboard list of these, placing in one column all those that are examples of **WORK** as it is understood in physics. Then ask, "Can anyone suggest why these are grouped together?" (Bring out the idea that in each case something has been moved through a certain distance.) Continue with this question, "If you were standing on a corner holding a heavy suitcase, would you be doing work?" Emphasize further that in a scientific sense no work is ever done unless a force succeeds in moving the body on which it acts through a certain distance. Ask, "What, then, is one factor involved in work?" "What is the other?" If possible, get from the class the two terms, "weight" and "distance moved." Lift one book, one foot. "Is this work?" Lift on book two feet. "How does this work compared with that of lifting one book one foot?" Lift two books one foot. "How does the work compare this time?" Lift two books two feet. "How much greater is the work this time?" "How then, can you always find the work?" "What unit is used to measure weight?" (See that the term unit is thoroughly understood by the class). "What unit would you use to measure distance?" "What, then, do you think would be our unit for measuring work?"

Follow this by several examples making sure that the class has a clear idea of how to measure work and the unit used in measuring it.

Tie a string around a book and pull it across the top of the desk with a spring balance. "What force am I exerting in order to pull this book across the desk?" Suspend the book by means of the balance. "With what force is the earth pulling this book toward the floor?" Therefore, we say the book weighs one pound and three ounces (make clear the specific idea that weight, the weight of this book for instance, is the measure of the force with which the earth attracts or pulls the book toward itself.) To go back to our problem—"What would you have to measure to find the work necessary to push or pull the ice up the plane?" "Is it more or less work to push the ice into a wagon by means of an inclined plane than it is to

lift it vertically from the ground?" Follow with a demonstration of the inclined plane (providing time permits).

Assignment: (If laboratory work is NOT included in the first lesson). Review carefully all points discussed in the lesson. List as many devices as you can that might be classed as an inclined plane. Find out something about the origin and history of the pound and foot. (See Hoadley, Millikan & Gale, and the Encyclopedia.) Assignment: (If laboratory work IS included in first lesson.) Be prepared to tell what your text has to say about work and units for measuring it. (Cite paragraphs and include also the other assignment.)

### Heating System of the High School

((All questions that cannot be answered at the time of this excursion may serve as problems for future study.))

#### I. FUEL.

What kind of coal is used in this system? Why? What amount of coal is required to run this system one year? How often should the furnace be stoked?

#### II. FIRE BOX.

How large is the fire box? How are the grates dumped? How does the construction of the grates provide for expansion? In spite of the fires, the boiler room does not seem excessively hot. Why? Why is it important to keep the ash pit clean?

#### III. BOILER.

Why is the boiler divided into a number of cylindrical sections rather than cast in the form of one large tank? How is the outside of the boiler cleaned? The inside? How would one tell when the boiler needed cleaning on the inside? What would be the danger of allowing it to become encrusted? How can you account for the crust which forms on the inside of boilers? What would likely happen if the steam pressure arose too high? What is the boiling point of water on the inside of the boiler? How do you account for this?

#### IV. OTHER PARTS OF THE SYSTEM.

What is the purpose of the safety valve? The pressure gauge? What is the pressure capacity of this system? Of what use is the water gauge? How is the system supplied with water? When? If the water should drop below the level of the water gauge, so that it would be impossible to tell just where the water was, what should be done? Why? Of what use are the dampers? How are the dampers worked? What provisions are made for increasing the heat needed for very cold weather? Why are steam pipes wrapped with asbestos? What is the purpose of the small valves at the end of the radiators? The steam is condensed in the radiators. The hot water which leaves a steam radiator may be as hot as the steam which entered it. How, then, has the room been warmed? What carries the smoke and gases up the chimney?

### Laboratory Suggestions

Students will enjoy making various simple pieces of apparatus if properly encouraged and directed. The experiments, numbered above 20 are suggested as very suitable, but others may be substituted. Thirty experiments or exercises may be regarded as the minimum, with a possible maximum of forty. These experiments should be written in the laboratory. A fine variety of supplementary experiments may be found in the following Laboratory Manuals:

Good's "Laboratory Projects in Physics," MacMillan Co.

Packard's "Everyday Physics," Ginn & Co.

Wauchope's "Laboratory Manual of Physics," Scott-Foresman.

Millikan, Gale, Bishop's "Laboratory Physics," Ginn & Co.  
 Reeve's "Physical Laboratory Guide," American Book Co.  
 Black's "Laboratory Manual in Physics," MacMillan Co.  
 Davis's Laboratory Physics," Looseleaf, Welch.  
 Conrad's "Physics Manual and Lab. Notebook," Atkinson.  
 Dean, Timmerman, Chesters "Lab. Manual and Physics", American Book Company.  
 Chute's "Laboratory Guide," Allyn & Bacon.

### List of Suggested Experiments

The "starred" experiments should be required of all students.

1. \*Linear and volumetric measurements.
2. \*Weighings.
3. \*Parallelogram of forces.
4. Laws of the pendulum.
5. \*Inclined plane.
6. \*The lever—principle of movements.
7. \*The pulley—mechanical advantage of single and combination pulleys.
8. Coefficient of friction.
9. \*Locating the center of gravity on irregular cardboard, and other objects.
10. Demonstrating Newton's second law.
11. \*Atmospheric pressure.
12. Boyles' law.
13. \*Archimedes principle—specific gravity of solid and liquid.
14. Pascal's law.
15. Molecular forces.
16. Testing accuracy of thermometers.
17. Charles' law.
18. Distillation.
19. \*Dew point.
20. Vaporization.
21. Heat of vaporization.
22. Heat of fusion.
23. Specific heat.
24. \*Expansion of solids owing to heat.
25. \*Electric bell and telegraph.
26. \*Kinds of cells—constructing each type for study and comparison.
27. \*The storage cell and electroplating.
28. \*Electro-magnets and permanent magnets; blueprints of magnetic fields.
29. \*Ammeter and voltmeter.
30. \*Cost of modern electric appliances.
31. Induction coil.
32. Motor and dynamo.
33. Transformer and telephones.
34. \*Static electricity.
35. Wireless telegraphy and telephony.
36. \*Velocity of sound.
37. \*Pitch of tuning fork.
38. Laws of vibrating strings.
39. Photometry.
40. \*Law of reflection.
41. Law of intensity.
42. Law of refraction.
43. Cameras.
44. Steam heating system—projects.
45. Hot water system.

46. Record of gas and electric meter readings.
47. Carburators.
48. Steam engine—threshing machine.
49. Cost of gas appliances—stoves, irons, etc.

#### Suggested Experiments in Problem Form.

I. PROBLEM: Which requires more work, to slide a cake of ice up an inclined plane, or to lift it vertically to the top of the plane?

APPARATUS: Inclined plane, small iron cart or roller skate, spring balance.

PROCEDURE: Find the weight of the car in pounds and the height of the plane—measure from top of board straight down to the surface of the desk. The product of these will give the work done in lifting car VERTICALLY. Now find length of plane—measure from top of board to desk—and the force in pounds required to slide the car with uniform speed up the plane, as indicated by spring balance. The product of these two will give work done in drawing the car UP THE PLANE. Call the weight of the car “resistance” and force exerted along the plane “effort.”

DISCUSSION: The work done on this machine, that is, effort times length of plane, is known as “input.” The work done by the machine, that is resistance times height of plane, is known as the “output.” Which is greater, the input or output? Answer problem. What causes this difference? What advantage is gained by using the inclined plane?

II. PROBLEM: What is the efficiency of the inclined plane in example No. 1? Would rolling the car up the plane make any difference in the efficiency?

APPARATUS. Same as example No. 1. Note: By efficiency of a machine is meant the relation of the work gotten out of it to the work put into it. That is, efficiency equals output divided by input. (indicate by equation.)

PROCEDURE: Find force required to roll car with uniform speed up the plane as indicated by spring balance. This force in pounds times length of plane will give the “input” when car is rolled up. Calculate efficiency when sliding car up. Calculate efficiency when car is rolled up.

DISCUSSION: Has the rolling increased or decreased the efficiency? What causes this difference? Can you suggest any method of further increasing the efficiency? Can you make a plane with an efficiency of 100 per cent? Why? (This is known as an ideal inclined plane.) What is the relation between input and output of an ideal plane?

III. PROBLEM: Is more work required to pull a safe up to the third floor with pulleys than to carry it up by hand?

APPARATUS: Two single pulleys—one fixed and one movable; two triple pulleys; weight of several pounds; pail and shot.

PROCEDURE: Arrange the movable pulley so that the resistance weight is supported by two cords (draw on blackboard.) Pour shot into pail until weight rises with uniform speed. Making use of two meter sticks, measure how far the pail moves downward in order to raise the weight through 10 cm. Find weight in grams, of resistance weight; also pail of shot. The work done by the pail of shot (the input) is found by multiplying together the weight in grams of pail of shot and the distance in centimeters it is lowered. This product is expressed in gram-centimeters. The work done in raising the resistance (the output) is the weight of the resistance in grams, times 10 cm the distance it is raised. Call the weight of the resistance weight, the “resistance” and the weight of the pail of shot, the “effort” in recording your results.

**DISCUSSION:** Which is greater the input or the output? Answer problem. What is the efficiency of the arrangement of pulleys? What causes the difference? Is it necessary to measure the distance moved by the R wt. and pail in order to determine the efficiency? Why? How could you improve the pulleys in order to make them move more efficiently?

**PROCEDURE No 2:** Arrange the two triple pulleys in such a way that the resistance is supported by four cards. Find effort by pouring shot into pail as before. Find weight of pail of shot in grams. Calculate efficiency. Repeat having resistance supported by five strings; by six strings.

**DISCUSSION:** How does efficiency of pulley vary with number of strings supporting resistance? State the law of the pulley.

**IV. PROBLEM:** To construct and operate a miniature electric lighting and power system and measure the current.

**APPARATUS:** Two ring-stands, two clamps, two crossbars of wood each five inches long, two dry cells, No. 24 copper wire (insulate), three 3-volt lamps, small motor, electric bell, pocket voltmeter, thirty-five emper pucket ammeter, push button.

**PROCEDURE:** First—using two ring-stands as supports, attach two cross bars by means of clamps. To these crossbars lead two No. 24 insulated wires each about a yard long. They should be coiled around the crossbars. To the set of two cells connected in series attach these wires. Care should be taken to keep the free ends of these wires from touching. With a knife remove the insulation from the wire at two opposite points and hang a 3-volt lamp across. You will find that this lamp does not let through as much current (amperes) as the cells can produce. Each lamp requires about a half-ampere. The 35 ampere ammeter is not sensitive enough to register the current required by a single lamp.

**DISCUSSION:** How many amperes would three such lamps use? Attach 3 lamps in parallel on the line wires. Disconnect one of the wires at the battery and attach the ammeter in the circuit. See if 3 lamps cause it to register. Having determined the total output of the two cells in amperes, how many such lamps could be operated at one time? Of course, the battery would not last long at this rate of current consumption.

**SECOND:** Operate a small electric motor from your line current. Connect the ammeter in series with the motor and note how much current it lets pass through. How many such motors could be operated at one time with a set of cells delivering ten amperes?

**THIRD:** Attach electric bells and buzzers with push buttons to the line and operate them. An electric door bell usually requires about one-fifth of an ampere and three volts. Which is more expensive—to ring a bell or to light a lamp of the type used above? How many dry cells are necessary to produce three volts pressure? How should they be connected? How might a cell or set of cells be short circuited? With respect to amperes, what does a short circuit mean? With respect to length of wire, how could a short circuit be avoided?

#### Textbooks in Physics

Mann & Twiss, Physics (Revised Edition); Scott, Foresman Co.  
 Lynde, Household Physics; MacMillan Co.  
 Milliken, Gale and Pyle, Practical Physics; Ginn & Co.  
 Hawkins, Elementary Applied Physics; Longmans.  
 Black & Davis, Practical Physics; MacMillan Co.  
 Carhart & Chute, Physics with Applications; Allyn & Bacon.  
 Butler, Household Physics; Whitcomb & Barrows, Boston.

Tower, Smith & Turton, Principles of Physics. (Revised edition)  
McGraw, Hill & Co.

Headley, Essentials of Physics. (Revised edition) American  
Book Co.

King, Physics of Agriculture; Mrs. F. H. King, Madison, Wis.

#### Manuals for Teaching

Twiss, Science Teaching; MacMillan Co.

Mann, Teaching of Physics; MacMillan.

Woodhill, Teaching of Science; MacMillan Co.

#### Reference Books for Students

Jackson & Black, Elementary Electricity and Magnetism.

Zerbe, The Automobile; Cupples, Leon & Co., N. Y.

Holland, Historic Inventions; George W. Jacobs, Phil.

Williams, How it Works; Thos. Nelson, N. Y.

Williams, How it is Made; Thos. Nelson, N. Y.

Williams, How it is Done; Thos. Nelson, N. Y.

Cressy, All About Engines; Funk & Wagnalls.

Harper, Electricity Book for Boys; Harper Bros.

Mayer, Sound; Appleton, N. Y.

Stokes, The Wonder Book of Light; Stokes, N. Y.

Kennelly, Wireless Telegraphy and Telephony; Moffatt, Yard Co.

Pullen, Mechanics; Longmans.

Randall, Heat; Wiley, N. Y.

Anderson, Electricity for the Farm; MacMillan Co.

Simmends, All About Air Craft; Funk & Wagnalls.

Rotsh, Conquests of the Air; Moffatt.

Knox, All About Engineering; Funk & Wagnalls.

Snyder & Palmer, One Thousand Problems in Physics; Ginn & Co.

Iles, Inventors at Work; Doubleday Page Co.

Croft, Practical Electricity; McGraw.

Darrow, Boys' Own Book of Great Inventions; MacMillan Co.

Williams, Wonders of Science in Modern Life; Funk & Wagnalls.

How to Make Good Pictures, Eastman Kodak Co., Rochester, N. Y.

Forbes, Course of Lectures on Electricity.

#### Visual Instruction

Wonders of Magnetism, Atlas Educational Film Co.

Modern Engineering Feats, Atlas Educational Film Co.

Manufacture of Big Guns, Atlas Educational Film Co.

Electrical Railroading, Atlas Educational Film Co.

Copper Mining, Atlas Educational Film Co.

Electrical and Mechanical Exp, Bollman, 44th St., N. Y. City.

Pathe Review No. 80, Radio Waves; Pathe.

How Steel is Cut, Beseler.

Lessons in Physics, No 4. (Expts. Liquid Air); Beseler.

Experiments in Liquid Air, Beseler.

Lessons in Physics. Part 6 (The Magnet) Beseler.

Simple Experiments in Electricity, Beseler.

Electrolysis of Metals, Educational Films Corp.

Additional film titles may be found in "Vocational & Industrial Education" a list published by the Extension Division of the Wisconsin University. See "General Science" division for address film companies, and list of free films.

#### Magazines

##### FOR PUPILS:

Radio News

Wireless Age

Electrical News

Aviation and Aircraft

Electrical World

Practical Electrics

(See General Science List.)

**FOR TEACHERS:**

Electric Journal  
 Journal of American Institute of Electrical Engineers  
 Telegraph and Telephone Age  
 Journal of Electricity  
 General Electric Review  
 Heating and Ventilating  
 (See General Science List)

**Tests and Measurements**

Chapman, Measurements of Physics Information, 27: 748 School Review.

Jones, F. T., Uniform Science Tests in Physics, School Review, May 1918.

Starch, Physic Tests; Kansas State Normal School, Emporia, Kan.

Camp, H. L., Scales for Measuring Results of Physics Teaching; University of Iowa, University of Iowa Studies, October 1st, 1921.

**Bibliography**

Hendricks, B. B., Projects in H. S. Physics; Sch. Sci. & Math. February, 1921.

Tippio, W. A., Projects in Girl's Physics; Sch. Sci. & Math. May, 1921.

Franklin, W. S., What is the Matter with Physics Teaching?; Eng. Ed. November, 1921.

Symposium on Purpose and Organization of Physics Teaching in Secondary Schools. (Pamphlet) School Science and Mathematics. (10 cents).

Johnson, Modern High School Education: (Chap. on Science.)

Parker, Teaching in High School; (Chap. on Science.)

Judd, Psychology of H. S. Subjects; (Chap. on Science.)

Colvin, Introduction to H. S. Teaching; (Chap. on Science.)

**Illustrative Material**

Unless indicated the following material may be had free of charge.

**CHARTS:**

Water wheels.

Pelton Water Wheel Co., San Francisco, Calif.

Jas. Leffel & Co., Springfield, Ohio.

Taper Shank Drill.

Cleveland Twist Drill Co., Cleveland, Ohio.

Longitudinal Section of Cars.

Overland Inc., Toledo, Ohio.

Nash Motor Car Co.

Separators.

De Laval Separator Co., 165 Broadway, N. Y. City.

Saws and Files, Henry Disston Co., Philadelphia.

Send for lists from the following companies:

A. W. Mumford, 536 S. Clark St., Chicago, Ill.

Cambridge Botanical Supply Co., Waverly, Mass.

Educational Exhibition Co., Providence, R. I.

F. M. Baker Apparatus Co., Syracuse, N. Y.

Kay-Scheer, 410 W. 27th St., N. Y. City.

**BULLETINS:**

Cooling Troubles.

Franklin Motor Car Co., Syracuse, N. Y.

Steel.

Illinois Steel Co., South Chicago, Ill.

Lecture Service.

General Electric Co., Schenectady, N. Y.

Tractor Field Book.

Farm Implement News, Masonic Temple, Chicago, Ill.

Various Types of Machinery.

International Harvester Co., Chicago, Ill.

American Farmer Supply Co., Chicago, Ill.

The Avery Company, Peoria, Ill.

Deere Company, Moline, Ill.

Emerson Brantingham Implement Co., Rockford, Ill.

An extensive list of miscellaneous material may be secured from the University of California, Berkeley, Calif. Ask for their lists of illustrative material, for vocational agriculture.

### Minimum Physical Apparatus

(Based on a class of six to eight students.)

- 3 Meter Rods with brass tips.
- 2 Spring balances, 8 oz., English and Metric units.
- 2 Spring balances, 24 oz., English and Metric units.
- 1 Inclined Plane with pulley (smooth board, 120x12 cen.)
- 1 Iron carriage (roller skate)
- 1 Small pail. (baking powder can with cord handle.)
- 2 Single pulleys, also triple pulleys.
- 2 Pounds lead shot.
- 1 Demonstration balance for lever.
- 1 Barometer tube, 80mm.
- 1 Pound Mercury.
- 1 2 qt. battery jar.
- 2 Electric light bulbs (burnt-out)
- 3 Iron and also lead balls, drilled 3/4 in.
- 1 Calorimeter.
- 1 Linear expansion apparatus.
- 1 Pound aluminum shot.
- 1 Box small iron brads.
- 2 Thermometers, Centigrade 10-110 degrees.
- 3 Dry cells.
- 1 Voltaic cell, with porous cup and extra elements.
- 1 Electric bell.
- 3 Push buttons.
- 1 Telegraph sounder.
- 1 Telegraph Set.
- 1 Pocket voltmeter—10 volts. (Everready)
- 1 Pocket ammeter—35 amps. (Everready)
- 1 Galvanometer frame. 3 windings.
- 3 Electric lamps—Mazda miniature—3 volt; also pendant sockets for same.
- 1 St. Louis motor, with field magnets.
- 1 Spool copper wire, insulated No. 24—also No. 32.
- 1 Small spool brass wire No. 24—also No. 27.
- 1 Magnet board—can be made.
- 1 Pkg. iron filings.
- 2 U. Magnets.
- 2 Bar magnets.
- 1 Magnetic compass, 50 mm. diam.
- 12 Pith balls.
- 1 Foot hard rubber.
- 1 Piece silk.
- 1 Soft iron bar—six inch spike.
- 1 Doz. knitting needles.
- 1 Set tuning forks—unmounted C. E. G. A.
- 1 Glass prism.
- 1 Brass protractor.

- 1 Micrometer, caliper, metric, friction head.
  - 1 Vernier, caliper, English and Metric.
  - 1 Gelatine color film, 8x10 in., red, green and blue.
  - 1 Doz. candles.
  - 1 Set lenses—demonstration set.
  - 1 Optical disc.
  - 2 Linen testers.
  - 1 Reading glass lens 2 in. diam.
  - 4 Pounds glass tubing, assorted.
  - 2 T.Tubes 2 in. arms.
  - 2 Y. Tubes 2 in. arms.
  - 6 Feet rubber tubing  $\frac{3}{4}$  in. inner diam.
  - 3 Feet rubber tubing  $\frac{3}{16}$  in. inner diam.
  - 6 Rubber stoppers to fit flasks—also 2 hole and 1 hole stoppers.
- (the following can also be used in Chemical laboratory.)

- 1 Laboratory balance.
- 1 Set Universal weights, 10 gm. to 1000 gms.
- 1 Bunsen burner or 2 alcohol lamps.
- 1 Set weights 1mg.—50 gm. (covered)
- 1 Blow pipe.
- 1 Ring stand, with 2 rings 2 in diam., 1 ring 5 in. diam.
- 2 Right angle clamps.
- 2 Pinchcock clamps.
- Wire gauze and evaporating dishes—two 12 oz. bottles.
- 1 Funnel 2 1-2 inches diam.
- 1 Pound ether, denatured alcohol, copper sulphate, ammonium chloride.

### PHYSIOGRAPHY

#### I. PLANETARY, OR SOLAR SYSTEM.

The Earth as a Planet.

- 1. Relation to solar system.
- 2. Form: oblate spheroid.
  - a. Proof: visible constellations change with latitude; curved shadow on moon; horizon increases in proportion to observers' attitude; top of vessel seen farthest; variation of time with longitude; weight of a body increases with latitude.
  - b. Cause and consequences.
- 3. Size.
 

Measurements and relation of gravity.
- 4. Motions.
  - a. Rotation: evidence, day and night direction, longitude and time, latitude, navigation and surveying, effects on life.
  - b. Revolution: indication, effects, inclination of axis, seasons, length of day and night, apparent motion of sun, influence.
- 5. Time: solar, civil, and conventional day. Standard time in U. S. and Canada. Relation of longitude and time.
- 6. Magnetism: mariners' compass, magnetic poles, declination, dipping needle, properties of magnets, earth as a magnet.
- 7. Maps and map projection.
 

Advantages and disadvantages of maps as compared with charts and models; necessity of projection; scales; representation of relief.

#### II. THE ATMOSPHERE.

- 1. Function: diffuses light; conducts sound; enables airplanes to fly; reduces weight of bodies immersed in it; retains heat;

produces waves, moves ships, drives windmills; transports moisture and light objects; destroys property and life.

2. Composition: properties and function of each constituent.
3. Pressure and Density: relation of pressure to density and temperature; evidence of pressure, and distinction between pressure and weight; measurement of mercurial and aneroid barometers; relation of pressure to altitude; Isobaric charts.
4. Temperature: temperature and heat distinguished; source of heat; liquid and metallic thermometers and their use; different capacities of land, water, and air for absorbing, reflecting and transmitting the heat of insolation; ways air is cooled and warmed; conditions affecting temperature; Isothermal charts.
5. Circulation: winds and their causes; instruments and methods of observation; classification of winds and their effects.
6. Moisture: evaporation; measurement of humidity; dew point and its relation to temperature; fog and clouds; rain and snow; dew and frost; hail and sleet; measurement of rainfall; rainfall charts; forms of rain; relation to life.
7. Weather and Climate: relation of weather to climate; elements determining weather; climate; controlling factors; weather maps and forecasting; work of U. S. Weather Bureau; climatic belts and regions; relation to life and to human industry.

### III. THE HYDROSPHERE.

1. Area, distribution, characteristics, and functions of the ocean.
2. Life in the ocean.
3. Movements of ocean waters.
  - a. Waves: causes; parts; form; rollers; breakers; surf and their effects (modified by use of oil); causes; tides and their effects; earthquake waves.
  - b. Currents: exciting and modifying causes; Atlantic currents; affects on land; use; affect navigation.
4. Life relations: barrier and highway; trade routes; economic products.

### IV. THE LITHOSPHERE.

1. Forms of relief.
  - a. Plains: Coastal plain—narrow, broad and embayed; Alluvial plain—formation and importance in history; Lacustrine plains; Glacial plains and Peneplains.
  - b. Plateaus: Dissected (canyons); Old (mesas, buttes); Broken (faults, fault line, fault plain); economic importance of plateaus.
  - c. Mountains: causes; classification; life history; mountains as barriers; climate; economic value (resorts, timber reserves, mineral and rock wealth).
2. Costal Formation.
  - a. Harbors: classification; advantages and disadvantages of each; economic importance.
  - b. Regular shore line: causes.
  - c. Irregular shore line: causes.
  - d. Modified shore lines due to plant (trees, marsh and eelgrass) and animal (especially corals) life.
  - e. Lake shore lines.
3. Rock: classification by origin and structure; a study of common rocks to secure ready identification.
4. Common minerals: quartz, feldspar, hornblende, mica,

amethyst, opal, garnet, calcite, salt, sulphur, gypsum, graphite

5. Soil: formation; residual; transported; varieties; adaptations; fertility—depending on constituents and physical conditions.
6. Erosion: causes and result.
7. Water other than ocean.
  - a. Source: precipitation, rainfall.
  - b. Disposal.
    1. Evaporation: controlling factors; amount; effect on temperature.
    2. Ground Water from seepage: destructive action—solvent action increased by carbon dioxide in solution, effects on salt and limestone, caverns and cave life, sink and shallow holes; constructive action—deposits as veins, stalactites, stalagmites; reappearance, springs, wells, artesian wells, mineral springs, hot springs geysers; dry farming.
    3. Run-off (small streams, rivers); work of rain and running water; valley development and surface topography; lakes—relation to rivers; life in rivers and lakes.
  - c. Glaciers: kinds; present and former ice sheets; formation; movement; moraines; work; disposal.
8. Volcanoes: distribution; causes: types; influence on topography and life.
9. Geographical Regions.  
Study South Dakota as a state region, with reference to structure, origin, development, and influence on the history and economic interests of the people.
10. Natural resources and food supply.

#### THE COURSE IN PHYSIOGRAPHY should include

1. At every step the practical relation of man to the topic under consideration.
2. A developed cause for every physiographic fact.
3. A greater emphasis on the lithospheric division.
4. Ample equipment.
5. Forty recorded experimental exercises to illustrate text study.
6. Three field excursions during the fall, and three during the spring.

The points to be studied, during field excursions will depend on the locality. The following topics should not be overlooked—clouds and their movements; weathering; erosion; transportation; deposition; river currents; waves; rocks; minerals evidence of upheaval and subsidence; land forms; location of highways; soils; falls; rapids; water power; distribution of plant and animal life.

#### Experimental Exercises

The following exercises are merely suggestive. Other exercises may be substituted, and added if desired.

1. Construct diagrams showing the position of the earth, sun and moon at the several phases of the moon, explaining these phases, and giving reasons why eclipses do not occur every month.
2. Construct diagrams showing partial and total lunar eclipses; partial, total and annular solar eclipses.
3. Find the place of sunrise and of sunset at any latitude at any time of the year.
4. Measure the angle of altitude of trees, towers and sun. Construct these.
5. Determine relative heat received from sun at different altitudes.

6. Construct and interpret sunrise and sunset curves.
7. Determine the observer's latitude from sun's altitude; and elevation of North Pole.
8. Interpret a contour map as to drainage, distances, slopes and relative heights.
9. Make vertical sections from contour maps.
10. Make a contour map from given data.
11. Determine altitudes by use of barometer.
12. Determine the dew point, and calculate from data the relative and the absolute humidity.
13. Account for position and migration of heat equator and cold pole.
14. Study isothermic charts of the world for January and July. Account for terrestrial winds in these months.
15. Interpret records of thermographs, barographs, and wind direction and study their mutual relations.
16. Keep for one month a daily record of pressure, temperature, wind direction, state of sky, humidity, location of approaching low and precipitation; plot pressure and temperature curves; and study mutual relations of conditions recorded.
17. Study the general wind direction about center of low and high areas from weather maps.
18. Make an isobar map of the U. S. from furnished data.
19. Make an isotherm map of the U. S. from furnished data.
20. Study the distribution of cloudiness and rainfall about several storm centers.
21. Forecast weather conditions from furnished data.
22. Plot curve representing daily rainfall for one year at a given station from given data.
23. Test sea water for density, taste, and amount of gas and of solid matter in solution.
24. Study magnetism, and prepare blueprints of various magnetic fields.
25. Study trade routes across the Atlantic and Pacific oceans from pilot charts.
26. Make an orderly arrangement of five minerals to show a scale of hardness.
27. Study quartz, feldspar, mica, and calcite as types of rock-forming minerals.
28. Study two ores of each: iron, copper, lead, zinc.
29. Study samples of soil.
30. Study salt, sulphur, gypsum, and graphite as types of non-metallic minerals of direct economic value.
31. Study eight or ten common rocks.
32. Study regular shore lines, Atlantic City topographic sheet.
33. Study irregular shore lines, Boothbay Me. topographic sheet.
34. Study glacial topography, Whitewater topographic sheet.
35. Make a collection of glaciated and of water washed pebbles.
36. Study distributions of coniferous, deciduous and tropical forests, and the relation of such distribution to climate.
37. Study distribution of areas producing the most important grains and the relation of such distribution to climate.
38. Study distribution of areas producing the most important fiber plants and the relation of such distribution to climate.
39. Study distribution of areas producing the most important fruits and the relation of such distribution to climate.
40. Study the distribution of human population as to density and the relation it bears to soil, climate, water power, harbors, and water routes.

**Text Books in Physiography**

- Salisbury, "Elementary Physiography", Henry Holt & Co.  
 Dryer, "High School Geography"; American Book Co.  
 Tarr, "New Physical Geography," MacMillan Co.  
 Davis, Bryant, Clendenin, Morrey, "Physiography for High Schools"; Heath.  
 Fairbanks, "Practical Physiography"; Allyn & Bacon.

**Supplementary Books**

- Dana, "The Geological Story."  
 Herrick, "The Earth in Past Ages."  
 Brigham, "Text Books of Geology."  
 Crosby, "Common Minerals and Rocks."  
 Davis, "Elementary Meteorology."  
 Greeley, "American Weather."  
 Powell, "Physiographic Regions in U. S."  
 Russell, "Rivers of North America."  
 Sutherland, "Teaching Geography."  
 Todd, "New Astronomy."  
 Willard, "Story of the Prairies."  
 Brigham, "Geographical Influence in American History."  
 Wright, "The Ice Age in North America."  
 Bulletins of the South Dakota Geological Survey, Perisho (Nos. 4 and 5.)  
 Bulletins of the Geology Department of South Dakota School of Mines, O'Hara (Nos. 4, 8 and 9.)

Many valuable auxiliaries may be secured free through the U. S. Dept. of the Interior, including relief, contour and weather maps and charts.

**Visual Instruction**

The Society for Visual Education, 327 S. LaSalle St. Chicago, Ill. lists the following films in physical and regional geography:

- The Earth and Worlds Beyond.  
 Formation of Glaciers.  
 The Work of Rivers.  
 Study of Low Shore Features.  
 Formation of Caves in Limestone.  
 Formation of Volcanoes.  
 Formation of Geysers.  
 Formation of Coral Growths.  
 New England—Parts I and II.  
 Middle Atlantic States—Coastal Plain.  
 Middle Atlantic States—Appalachian Highlands.  
 Southern States—Part I and II.  
 Central Plains—Parts I and II.  
 Great Plains. Study of Bold Shore Feature.  
 Western Plateaus.  
 Rocky Mountains. Pac. Mts. and Lowlands.  
 The National Non-Theatrical Motion Picture, Inc., 230 W. 38th St., New York, N. Y., have produced the following subjects:
- The Mystery of Space No. 1.  
 The Mystery of Space No. 2.  
 Worlds in the Making.  
 Earth and Moon No. 1.  
 Earth and Moon No. 2.  
 God Divided the Night From the Day.

A few additional subjects, and their distributors are listed below:  
 The War of the Elements (Tornadoes, Hurricanes, Earthquakes, Floods) Atlas Educ. Co.  
 Flaming Ice, Robertson—Cole.  
 Old Faithful (geyser) Prizma.  
 Study of a Mountain Glacier, Society for Visual Education.  
 The Why of a Volcano. Educ. Film Co.  
 A Study in Sand. Educational Film Corp.  
 The Yosemite Valley. Fitzpatrick and McElroy.  
 Evolution, Educational Film Corp.  
 Geology Part I and II. Beseler.  
 In the Hanging Glacier Country, Educational Film Corp.  
 Tides and the Moon, Goldwyn Exchange.  
 Pathe Review No. 25, (Nature's Wonderland), Universal.  
 The Four Seasons, Famous-Lasky Players.  
 Marvels of the Universe, Goldwyn.  
 Alaskan Revelations, Prizma.  
 God's Handiwork, Goldwyn.  
 Along the Columbia River, The Lea-Bel Company.  
 Commercial Geography, Universal.  
 Grand Canyon of the Colorado River, Fitzpatrick and McElroy.  
 Grand Canyon, The Lea-Bel Company.  
 Niagara, Prizma, or Select.  
 Niagara Falls, Beseler.  
 Petrified Forests of Arizona, University of Wisconsin.  
 Waterfalls of Idaho, Beseler.  
 Wonderful Niagara, Educational Films Corp.  
 Combatting the Elements, Henry Bollman.  
 See "General Science" division address of film companies.

### Apparatus

Much of the apparatus and material used in other science work.  
 Mineral collections of not less than 30 minerals and 30 rocks.  
 Six pairs of shears (8 in.)  
 Brush (3 in.) for map mounting.  
 Outline map of the world (unmounted).  
 Outline map of the United States.  
 Outline map of South Dakota.  
 Profile paper (20 in. wide.)  
 Globe, plain mount (12 inch.)  
 Globe mounted in a meridian.  
 Twelve globes mounted on wire stand (6 in.)  
 Set of physical wall maps (Johnston's best imported, good).  
 Sun board, with book of directions.  
 Planetarium, with book of directions.  
 Maximum and minimum thermometer.  
 Aneroid barometer.  
 Sight compass in watch case.  
 Rain gauge.  
 Specific gravity balance.  
 Weight in blocks 100g to 1kg.  
 Hammer with wedge-shaped ends.  
 Tripod lens.  
 Tables upon which to work.  
 Soil thermometer, Hygrometer, and wind vane.

## NORMAL TRAINING

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While a high school cannot justly or to advantage undertake the peculiar work of a Normal School, present conditions make it necessary for our high schools to assist, whenever local conditions and equipment permit, in furnishing a certain professional training for those graduates who will take up the work of teaching without regular normal school training. It should never be understood as equivalent to, or as taking the place of, a regular course in Normal Schools. On the other hand, whenever it is given it should be undertaken in a serious way and be made anything but a "snap course." Only third and fourth year pupils shall be admitted to this work; consequently, it is not to be offered in schools that do not have an accredited four year course and an adequate teaching force and equipment. A professional library of at least fifty carefully selected pedagogical books should be in every school that attempts this work. The South Dakota school paper should be on the library table, together with at least one teacher's magazine of national scope; pupils should be required to read these carefully and be prepared to report on various articles contained therein. If this course fails to instill a professional attitude in the pupil taking it, it fails to accomplish its chief purpose.

### **Requirements for an Approved Normal Training Course**

1. The high school must be recognized by the Superintendent of Public Instruction as a **FOUR YEAR ACCREDITED HIGH SCHOOL**.

2. The clerk or the secretary of the Board of Education must notify the Superintendent of Public Instruction that the state aid is desired.

3. The Board of Education shall provide a department in the high school to be designated as a Normal Training Department to be in charge of a properly qualified instructor.

4. A course of study shall be provided in which instruction shall be given in pedagogy, including methods, principles of education, school management and practice teaching. Such course of study shall be similar in content to the requirements given elsewhere in this Manual.

5. Each school shall furnish proper equipment for carrying on the normal training work, including a professional library of not less than fifty books. Such library shall be increased by the addition of not less than five professional books each year.

6. Each pupil enrolling in the Normal Training Department shall fill out and sign an enrollment card furnished by the Department of Public Instruction. Such enrollment cards shall be collected and sent to the Superintendent of Public Instruction not later than the end of the second week of school.

7. The Superintendent or Principal of the school shall make a final report to the Superintendent of Public Instruction at the end of the school term, giving such information as shall be requested. The Superintendent or Principal of the school also shall make such other reports as may be requested by the Superintendent of Public Instruction.

### **AMOUNT OF STATE AID ALLOTTED TO EACH HIGH SCHOOL**

Each high school in this state establishing an approved normal training department may receive aid from the state as follows:

1. A school enrolling not less than five (5) or more than ten (10) students in the normal training classes—\$500.00 per annum.
2. A school enrolling more than ten (10) and less than twenty (20) students in the normal training classes—\$700.00 per annum.
3. A school enrolling twenty (20) or more students in the normal training classes—\$1,000.00 per annum.

PROVIDED, that no high school shall receive more than \$1,000.00 state aid for normal training in a year, and not more than one high school in any county shall receive state aid until an opportunity has been offered to one school in each county of the state to comply with the requirements. No state aid can be paid to any high school for normal training in any county where there is already established a state educational institution maintaining a normal department approved by the Superintendent of Public Instruction.

### Course of Study

The course of study in approved normal training department in high schools shall meet the following requirements:

- |  |          |                    |
|--|----------|--------------------|
| 1. Rural School Management and Rural Sociology | 36 weeks | 1 unit             |
| 2. Reviews and Special Methods                 | 36 weeks | 1 unit             |
| 3. Principles and General Methods of Teaching  | 18 weeks | $\frac{1}{2}$ unit |
| 4. State Course of Study and Practice Teaching | 18 weeks | $\frac{1}{2}$ unit |
| 5. Elective                                    | 36 weeks | 1 unit             |

Note: Numbers 3 and 4 to be offered in the fourth year only.

### Qualifications of Normal Training Teachers

The teachers in approved normal training departments in high schools shall meet the following requirements:

1. The minimum scholastic attainment of such teachers shall be equivalent to graduation from a recognized college or university requiring the completion of a four year course of study of 120 semester hours in advance of a standard four year high school course.
2. The minimum professional training of such teachers shall be eighteen semester hours in education.
3. The teachers in approved normal training departments shall present satisfactory evidence of at least sixty-four (64) weeks teaching experience in the grades below the high school, at least one-half of which shall have been in rural schools.

### Entrance Requirements of Pupils in Normal Training Department

Before any pupil shall be eligible to be enrolled in an approved normal training department in high school, he shall be able to meet the following entrance requirements:

1. Must have satisfactorily completed at least eight units for juniors and eleven units for seniors, of accredited high school work. (By unit is meant standard high school unit of credit as defined in the State High School Manual.)
2. The juniors must be at least in the 16th year of their age and seniors in the 17th year of their age. Juniors should earn only one credit of this course, viz., Rural School Management and Rural Sociology, or Reviews and Special Methods.

### Certification

Completion of the normal training course leads to a second grade teacher's certificate. A certified copy of the high school grades including the grades in the normal training subjects together with a Teacher's Oath signed by the applicant and properly certified, should be sent to the Superintendent of Public Instruction. If these grades are found satisfactory and include the constants required in the State Course of Study, and evidence is furnished that the applicant is at

least eighteen years of age and of good moral character, a second grade certificate will be sent to the county superintendent of the county in which the high school is located, and the applicant may obtain it by paying the county superintendent the statutory fee of one dollar.

### **Principles and General Methods of Teaching**

This course should cover, in a more or less elementary way, the principles and general methods of teaching. A good standard textbook, not too difficult, should be in the hands of the pupils while pursuing this course. Colgrove's "The Teacher and the School", Betts "Class-Room Methods and Management," and "How to Teach", by Strayer & Norsworthy, are recommended as suitable texts for the use in this course.

### **Rural Sociology and Rural School Management**

(One unit.)

(a) This course is designed to acquaint the pupil with rural conditions and problems. One-half of the year should be given to the course in rural sociology. Some such texts as "Country Life and Country School," Carney, or "Rural School," Kennedy, should be used. If the pupils do not come from rural homes and are not acquainted with rural conditions, this work is to acquaint them with the manner of living in rural communities in which they are to teach. While reference books concerning this subject will be of value, the course should be made very concrete by excursions to the country or personal descriptions of rural homes in the country from which will come the pupils of the rural schools that these normal trainees are preparing to instruct. Concrete illustrations of the rural school buildings, the boarding house problems and all other matters affecting the rural teacher's life, should be brought out in this course.

(b) In the course in Rural School Management, the work should be planned so as to acquaint the pupil with the management of rural schools in South Dakota. While a textbook like Wilkinson's "Rural School Management," or Seeley's "The Country School," should be followed as a textbook additional work which would so acquaint the pupils should be given. Special attention should be given to forms of reports, school records, the daily program, the classification of pupils according to the state course of study, elements and responsibilities that make up the regular teacher's contract, the care of school houses with reference to the pupils' health, and other matters that are pertinent to rural school teaching in this state.

### **Reviews and Special Methods of Teaching Common Branches.**

(One unit.)

This course is designed primarily to provide special methods of teaching Reading, Arithmetic, Geography, Language and Grammar, and United States History. An opportunity should be given the pupils to review those subjects and at the same time special methods of teaching each of these subjects should be given. Charter's "Teaching the Common Branches" and many other texts giving methods of teaching particular subjects would be of value in this course. The State Course of Study should be in the hands of the pupils constantly.

### **State Course of Study and Practice Teaching.**

(One-half unit.)

The course in observation and practice teaching should be given during the last half of the second semester of the senior year. The first week of the work should be entirely of observation on the part of the pupils. During the week of observation, the pupils should visit regular grade classes and observe the way the classes are conducted

by the regular teachers in charge. Reports upon what they have observed then should be made to the regular normal training instructor, and discussions had as to the points brought out in the recitations observed. Recitations in different subjects under different teachers should be observed and reported. The common school course of study should be the handbook of the pupils throughout this course. They should absolutely master it with regard to organization of subject matter and methods of presentation. This work then should be followed by actual practice teaching on the part of the pupils. Before attempting this, the pupils should make outlines of the lessons to be presented which should be approved by the normal instructors. Pupils then should be given charge of regular classes in the grades under the supervision of the teacher in charge of the room. This teacher should give her whole attention to observing the pupil who is conducting the recitation, and such teacher should take notes in a notebook, and a special report be made upon the work of the practice teacher to the normal training instructor.

"Observation lessons need to be definitely planned and the students given a clear understanding of what they are to look for, the method to be used, the idea of principle involved and the results to be desired. Observation of classroom work should follow the study of method and observing demonstration teaching. Care should be taken to see that the normal trainees go to the classrooms to observe in the spirit of the learner rather than that of the critic.

The teacher whose room is to be visited should also be informed of the intention of the class to visit at a given period, the work they desire to observe and any special points that the class may desire to have made plain. Devote the majority of the lessons to the primary grades. The class should observe the same work two or three days in succession and after conference with the room and normal training teachers, it would be well for the student to teach the subject observed.

Where possible the student may be assigned to assist the regular grade teachers during a part of each day for a period of two or three weeks. They should be required to assist in gathering and preparing illustrative material and in making out daily plans."

The following outline for observation will be found suggestive, but is not intended to be complete. Superintendents and normal training teachers will work out additional plans as needed.

A lesson or a series of lessons may be judged:

#### How to Judge a Lesson.

1. By its aims and purposes—that is, by WHAT the teacher tries to do. This relates chiefly to the subject matter.

(a) Was the subject matter presented in harmony with the general aim of education, that is, was it of actual life value to the children?

(b) Did the subject matter and the instruction given fulfill the McMurray standards in the following respects:

1. Motivation. Was it motivated? Did the children feel a purpose in the lesson which APPEALED TO THEM?

2. Organization. Were both the teacher's lesson and the children's ideas well organized?

3. Judgment. Was there opportunity for the children to "judge relative values," or compare ideas and make judgments on points during the lesson?

4. Initiative. Did the children show any initiative by making original suggestions of worth during the lesson?

2. By its method, that is, by HOW the teacher tried to realize her purpose. This related to the teacher's skill or technique.

- (a) Types of teaching—Were the types of lessons used, rightly chosen for the purpose and subject matter presented? Were they well handled and combined?
- (b) Questions. Were the questions good?
- (c) Assignments. Were the assignments problematic, motivated, definite and reasonable? That is, did they appeal to the children, make them understand just what they were to do, and reveal a purpose in doing the task set?
- (d) Illustrative materials and devices. Were these well chosen, ready at hand and effectively used?
- (e) Study. Was every opportunity improved for showing the children how to study and inculcating economical habits of study?
- (f) Lesson-plan. Was the lesson plan practical and effective? Did the teacher follow it approximately and keep to her main purposes? Was she skillful in meeting unexpected situations?

3. By its results, that is by whether the teacher does what she intended to do. Did the teacher accomplish the specific purpose or aim of the lesson? Were the children interested? Were they instructed? Did they get something? Was what they got worth while? Did they think? Did they fix facts or information? Did they show growth in correct habits and right attitudes?

Note: Educational measurements and tests should be used occasionally in demonstration schools for testing results.

4. Presenting criticism. The demonstration teacher, as well as the training teacher must use the utmost tact and sympathy in presenting criticism to students. The best time for doing this and talking over lessons is in the evening after school hours. In discharging this duty the demonstration teacher will find the following points suggestive:

- (a) In general, criticism should be presented much as a development or inductive lesson is taught; that is, the student should be led to criticise herself and suggest improvements **THROUGH QUESTIONING**.
- (b) Before meeting the student for this purpose, the demonstration teacher should go over her notes and organize the points of criticism she expects to present, numbering them for clearness.
- (c) Pick out and commend the good points in the teaching, first explaining why they are good.
- (d) In presenting corrective criticism induce the student to criticise herself first in the light of standards established by the training course.
- (e) Never make an unfavorable criticism without suggesting a better substitute for what she has done. That is, make your criticism constructive.
- (f) Illustrate the points of criticism made, by several concrete examples. If the student's questioning is poor, for example, several of the poor questions used should be cited, and better questions given to illustrate the poor quality.
- (g) Summarize the criticisms given each day in the form of definite statements and have the student keep a numbered list of these in her plan book. Review these occasionally by referring to them, and particularly by making a final summary of them at the end of each week or at the close of the practice period.

Note: The above outline on "How to Judge a Lesson" is taken from the suggestions to Teacher Training Departments in High Schools of Minnesota by courtesy of the State Department of Education of Minnesota.

**PROFESSIONAL BOOKS****For High School Normal Training Departments**

- Play and Recreation for the Open Country—H. S. Curtis. Ginn & Co. Chicago.
- How We Think—J. Dewey. D. C. Heath & Co., Chicago.
- Principles of Rural Economics—Thomas Nixon Carver. Ginn & Co., Chicago.
- The American Rural School—H. W. Foght. Macmillan Co., Chicago.
- Better Rural Schools—George H. Betts and Otis E. Hall. Bobbs-Merrill Co., Indianapolis.
- Human Behavior—Colvin and Wm. Bagley. Macmillan Co., Chicago.
- The Rural School, Its Methods and Management—Culter and Stone Silver Burdett & Co., Chicago.
- The Rural Teacher and His Work—H. W. Foght. Macmillan Co., Chicago.
- Teaching Children to Study—Lida B. Earhart. Houghton, Mifflin & Co., Chicago.
- Art of Study—B. A. Hinsdale. American Book Co., Chicago.
- Moral Principles in Education—John Dewey. Houghton, Mifflin & Co., Chicago.
- Special Method in History—Charles H. Murry. Macmillan Co., Chicago.
- Rural Life and Education—E. P. Cubberly. Houghton, Mifflin & Co., Chicago.
- The Hygiene of the School Child—L. M. Terman. Houghton Mifflin & Co., Chicago.
- School Discipline—W. C. Bagley. Macmillan Co., Chicago.
- Principles of Education—F. E. Bolton. Chas Scribners Sons, N. Y.
- Every Day Problems in Teaching—M. V. O'Shea. Bobbs-Merrill Co., Indianapolis, Ind.
- The Recitation—George H. Betts. Houghton, Mifflin & Co., Chicago.
- Teaching the Common Branches—W. W. Charters. Houghton, Mifflin & Co., Chicago.
- Best Methods of Teaching in Country Schools—G. Dallas Lind. Hinds, Noble & Eldridge, New York.
- An Outline of Methods in History—E. W. Kemp, Inland Co.
- How to Teach American History—J. W. Wayland. Macmillan Co., Chicago.
- Elementary School Standards—F. M. McMurray. World Book Co., New York.
- Everyday Pedagogy—L. I. Lincoln. Ginn & Co., Chicago.
- The Method of the Recitation—C. A. and M. F. McMurray. Macmillan Co., Chicago.
- Elements of General Methods—C. A. McMurray. Macmillan Co., Chicago.
- How to Teach—Strayer and Norsworthy. Macmillan Co., Chicago.
- Methods of Teaching—W. W. Charters. Row, Peterson & Co., Chicago.
- Handbook of Practice for Teachers—C. A. McMurray. Macmillan Co., Chicago.
- Special Method in Language—C. A. McMurray. Macmillan Co., Chicago.
- The Teaching of English Grammar—F. A. Barbour. Ginn & Co. Chicago.
- The Teaching of English—Percival Chubb. Macmillan Co., Chicago.
- Methods and Aids in Geography—C. F. King. Lothrop, Lee & Shepherd Co., Boston, Mass.
- Special Methods in Geography—C. A. McMurray. Macmillan Co., Chicago.

- The Teaching of Civics—Mabel Hill. Houghton, Mifflin & Co., Chicago.
- Teaching Elementary School Subjects—L. W. Lapeer. Charles Scribners Sons, New York.
- Primary Methods—J. E. Black, School Methods Co., Chicago.
- The Teaching of English—Paul Klapper. D. Appleton Co., Chicago.
- Stories and Poems with Lesson Plans—Anna E. McGovern. Educational Publishing Co., Chicago.
- Educative Seat Work—Edward Worst and Edna Keith. Thomas Charles Co., Chicago.
- The Teaching of Arithmetic—Alva Walker Stamper. American Book Co., Chicago.
- Special Method in Arithmetic—C. A. McMurray. Macmillan Co., Chicago.
- The Teaching of Primary Arithmetic—Henry Suzzallo. Houghton millan Co., Chicago.
- Agricultural Education for Teachers—Garland Arinor Bricker. American Book Co., Chicago.
- Schools of Tomorrow—John Dewey and Evelyn Dewey. E. P. Dutton & Co., New York.
- How to Tell Stories to Children—S. C. Bryant. Houghton, Mifflin & Co., Chicago.
- Stories to Tell to Children—S. C. Bryant. Houghton, Mifflin & Co., Chicago.
- Some Great Stories and How to Tell Them—R. T. Wyche, Newson Co., Chicago.
- The Child and His Spelling—W. A. Cook and M. V. O'Shea. Bobbs-Merrill Co., Indianapolis, Ind.
- The Teaching of Spelling—Henry Suzzallo. Houghton, Mifflin & Co. Chicago.
- The Teaching of Handwriting—F. N. Freeman. Houghton, Mifflin & Co., Chicago.
- Primary Methods (Penmanship in lower grades)—J. E. Black, School Methods Co., Chicago.
- Manual for Teachers—Palmer System.
- Teaching Children to Read—Paul Klapper. D. Appleton Co., Chicago.
- Teaching Children to Read—Paul Klapper. D. Appleton Co., Chicago.
- Special Methods in Reading for the Grades—C. A. McMurray. Macmillan Co., Chicago.
- The Dramatic Method of Teaching—Harriet Finley-Johnson. Ginn & Co., Chicago.
- Illustrated Phonics—M. I. Ives. Longsman, Green & Co., N. Y.
- Reading, How to Teach It—S. L. Arnold. Silver Burdett & Co., Chicago.
- How to Teach Reading in the Public School—S. H. Clark. Scott Foresman & Co., Chicago.
- The Teacher and the School—Colgrove. Scribner, New York.
- The Country School—Seeley. Scribner, New York.
- Principles of Teaching—Thorndike. A. G. Seiler, New York.
- The Theory of Teaching—Salsbury. Row Peterson & Co., Chicago.
- Country Life and the Country School—Row, Peterson & Co., Chicago.
- School Recreations—Mann. American Book Co., Chicago.
- The Teaching of Geography—Southerland. Scott, Foresman Co.
- How to Teach History—Hinsdale. Appleton Co.
- How to Teach Arithmetic—Brown and Coffman. Row, Peterson & Co.
- Rural School Management—Wilkinson. Silver Burdett Co.
- Method of Teaching History—Mace, Ginn & Co., Chicago.
- Method in Teaching Reading—Sherman and Reed. University Publishing Co.

Public School Methods. Methods Co., Chicago.

Teaching to Read—Hughes. American Book Co., Chicago.

The Teacher, the School and the Community—McFee. American Book Co., Chicago.

The Classroom Teacher—Strayer and Englehart. American Book Co., Chicago.

Familiarize the pupils with the contents of the state course and impress upon them that the state law requires that this course of study be followed as an outline in the rural schools. Monthly tests and all required reports should be carefully studied. Impress upon the pupils that the best friend the rural teacher has is the county superintendent who should be consulted freely for advice and guidance.

## PHYSICAL EDUCATION

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(One unit.)

Education is the making of better life—physically, mentally, morally and socially. Physical Education is one of the best means, directly and indirectly of accomplishing this, and so should occupy an important place in the school curriculum.

The Aims of Physical Education are:

1. Health.
  - (a) Improvement of posture.
  - (b) Improved functioning of vital organs.
  - (c) Development of general bodily vigor.
2. Social and Moral Development.
  - (a) Cultivate the spirit of fairness, truthfulness, ability to cooperate, respect for others' rights, self control and loyalty.
3. Mental Development.
  - (a) Develop powers of observation, concentration, independent thinking, quick response, correct posture, coordination and skill.

Physical Education should be offered for both boys and girls, a minimum of two periods a week for four years, and opportunity offered and enthusiasm developed for elective work in interclass athletics and outdoor sports—activities the pupils can carry on by themselves.

One-fourth unit should be given for thirty-six weeks, two periods a week—the same as for laboratory.

Classes should, if possible, be divided according to the physical fitness and the interests of the pupils—those desiring and able to enter interclass games being placed in one division, with less work in posture, gymnastics, and folk dancing.

Physical Education for High School Girls should consist of:

1. Marching and Simple Tactics, 1, 2. (See appended reference list). Marching forward, backward, sidewise. Column right by single file, twos, fours. Wheeling in fours. By right flank. To rear.
2. Gymnastics.
  - (a) Formal Gymnastics, 3, 4. (See references).
  - (b) Individual Corrective Exercises. (See references).
  - (c) Apparatus—wands, stall bars, horizontal ladder.
  - (d) Tumbling—walks and rolls.
  - (e) Natural Gymnastics for swimming, basket and base ball.
3. Dancing.
  - (a) Folk—as Pop goes Weasel, Virginia Reel, John Brown, Irish Lilt, Seven Jumps, Black Nag, Czardas.
  - (b) Aesthetic:
    1. Rhythmic steps as march, skip, slide, polka, mazurka.
    2. Hinman, Chalif, or other simple dances.
4. Games and Athletics.
  - (a) Group and Circle (some relays) as: Three Deep, Stride Ball, Black and White, Last Couple out.

- (b) Team Games.
  - 1. Lower Organization as; Progressive Dodge Ball, Overtake, Bombardment, End Ball, Captain Ball, Bowling and Long Ball.
  - 2. Higher Organizations. Fall Newcomb; Winter Basket-ball, Spring base-ball, and Volley Ball. (In these, squads should be organized to compete against one another, and thus give all an equal chance.
- 5. Recreative Activities in the Home and Community. (2½ hours should be required each week) as walking, skating, skeeing, swimming, bicycling, horseback riding, rowing, golf, camping, and gardening.
- 6. Hygiene.
  - (a) Examination of each pupil for discovery of defects of eyes, nose, throat and heart, which should be referred to a physician at once; and for classification of pupils for exercises.
  - (b) Talks and Discussions on Phases of Hygiene (10 minutes of Physical Education period twice a month). Also during the regular class period topics of air, bathing, clothing, sleep and diet may be taken up informally and incidentally. (Note: Numbers refer to books in the list of references at close of this article.)

The boys' course should include a greater amount and more complex forms of marching and military tactics, more apparatus work of all kinds with their formal gymnastics requiring greater skill in the control of the body; more track and field work, and tumbling. Their dancing should be athletic in character and not so prominent as for girls. Their games should be fewer in number and of the higher organized type: Fall, soccer and some football; Winter, basket ball; Spring, baseball and track and field athletics.

A suggested arrangement and time allotment for the types of physical education, for two forty-five minute lessons a week follows: (10 minutes allowed for dressing).

#### Girls

- A. 1/3 of Period.
  - Marching, simple tactics of formal gymnastics.
- 1/6 of Period.
  - Apparatus, natural gymnastics or tumbling.
- 1/2 Period.
  - Games.
- B. 1/3 of Period.
  - Rhythmic steps or hygiene talk (twice a month.)
- 2/3 of Period.
  - Folk dances and games.

#### Boys

- A. 1/4 of Period.
  - Marching tactics.
- 3/8 of Period.
  - Formal gymnastics or apparatus, or track and field.
- 3/8 of Period.
  - Games.
- B. 1/6 of Period
  - Natural gymnastics.
- 1/6 of Period.
  - Tumbling.
- 2/3 of Period.
  - Game.

In the short time allowed for Physical Education in the High School, we can never hope to secure our aims by classroom work alone. We must place the emphasis on games and sports—activities which the pupils will be inclined to carry on outside school hours and in later life. Games should be held for girls in: Newcomb (Fall) Basketball, Girls Rues. (Winter) Baseball, Indoor and Volley Ball, (Spring) for boys in Soccer, Some Football, Basket ball, Baseball, Indoor and Volley Ball, Track and Field. These should be played between organized squads and classes, giving all a chance, rather than picking a single representative team.

The training of "prize winning athletes" is not the business of a public school. Big championship meets, which serve as dramatic climaxes for the days of training and class competitions may, however, well be held occasionally. There are great socializing occasions when the school spirit and loyalty run high, and faculty and students as a whole are welded together into one great family. If we are to regard athletics as a means of promoting physical development, health, standards of square dealing, then the many, rather than the few, must be reached.

These natural plays and games have greater possibilities of affecting the entire life of the individual than do the other forms of Physical Education; but in all forms the social, moral, mental, and physical values must be definitely aimed for and emphasized else the most undesirable qualities are more than likely to develop. A player will naturally respond to a situation in the instinctive emotional way which is usually contradictory to our modern standards of social conduct. Through training such as is here outlined, satisfactory substitution or sublimation of this natural response results.

Pupils must be taught to play hard, to the limit of their ability, whether winning or losing, but always fairly and honestly; to treat their opponents as friends and guests; to accept defeat with a smiling face but with a determination to work harder the next time. They must be made to feel they are the representatives of their group or school and for it they should gladly lose rather than resort to any unfair or questionable tactics to win.

#### List of References

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2. Infantry drill regulations, 75¢—W. S. A.
3. Skarstrom Gymnastic Teaching, \$3.50—A. P. E. A., Springfield, Mass.
4. Mich. Syllabus of Physical Education, 50¢—Dept. R. Mats, Lansing, Mich.
5. Health by Stunts—Pearl & Brown, \$1.40—Macmillan.
6. Athletic Badge Tests, 20 Playground & Reer Ass'n., N. Y.
7. Athletic Training. Murphy, \$1.75, A. P. E. A., Springfield, Mass.
8. Games for Home School—Bancroft, \$2.40. MacMillan.
9. Spaulding Rules of Basketball, 10c; Newcomb, 10c; Indoor Baseball, Volleyball, 10c; Soccer, 25c.
10. a. Burchena American Country Dances \$1.50. Schirmer, N.Y.  
 b. Burchena Dances of People, \$2.00, Schirmer, N. Y.  
 c. Himnan III Ring Games, \$1.60, V. Clogs. Barns.  
 d. Eng. Country Dances, H. W. Gray, New York.
11. a. Fisher and Fiske—How to Live—Henry Holt & Co.  
 b. Elements of Hygiene and Sanitation—Hough and Sedgwick, Ginn & Co.  
 c. New Jersey Syllabus of Physical Education.  
 d. Bancroft Posture of School Children—Macmillan.
12. Physical Education Review.

## SOCIAL SCIENCES

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### HISTORY

"In its amplest meaning, history includes every trace and vestige of everything that man has done or thought since first he appeared on earth. It may aspire to follow the fate of nations or it may depict the habits and emotions of the most obscure individuals. Its sources of information extend from the rude flint hatchets of Chelles to this morning's newspaper. It is the vague and comprehensive science of past human affairs."—James Harvey Robinson.

The great object of history is to learn how man became what he is from what he was. History is really a record of man's struggle for freedom and some teachers have made this a general theme carrying on the work by the Problem and Project method, such as man's struggle for freedom along the line of physical freedom which involves all inventions tending to give freedom of the body such as railroads, automobiles, aeroplanes, telephones and the telegraph; civic freedom which involves all development for freedom in the line of governments, and religious freedom which involves everything that has tended to permit man to worship God according to the dictates of his own conscience.

#### General Suggestions

Emphasize the fact that students of history are studying their own inheritance. They are not merely studying past events; that is chronology; they are studying institutions, causes and effects of their rise and decline, and their contribution to the social inheritance.

Do not fail to collect all the pictures, maps, and other illustrative material that is available. Notebooks should be kept, written in ink. Definite projects should be worked out, also problems.

Dates are important, but do not make the mistake of teaching isolated dates. A good plan is that instructor and pupils make a practice of never studying an important epoch without fixing its date. This practice would furnish a reason for keeping dates in mind.

Do not neglect review; drill is essential, although history courses should train in original thinking as well as in reproduction. Just because you have one method of teaching which seems to work well, do not "run it into the ground" by failing to vary from it. Change and variation are absolutely necessary in dealing with young people. Do not talk too much; the recitation should not be a lecture by the teacher, but rather a social exercise, where the teacher leads in drawing out the worth while contributions of the class. The text should be the basic guide for the search for information, but in no case a limiting tyrant or an "ipse dixit." Textual criticism, based on reading and verification of reference books is very profitable. Some of our history texts, particularly American histories, have been much criticized of late and certainly the opinions expressed in these texts bear scrutiny, and training in that sort of scrutiny may well begin in the upper years of the high school.

#### A. Ancient History (One unit.)

##### I. The Oriental Nations.

1. Introduction: scope and course of ancient history.
2. Egypt, 5000 B. C.

3. The Tigris-Euphrates Valley, 5000 (?) - 538 B. C.
4. Syria (I) The Phoenicians.
5. Syria (II) The Hebrews.
6. Media and Persia. 850 (?) - 514 B. C.
7. Summary and review of the oriental nations.
8. The land and the Aegean basin.
9. The people: migration and expansion.
- II. Ancient Hellas: early development, 2000 (?) - 750 B. C.
  10. The Epic or "Homeric" age, 1000-750 B. C. (approximately).
  11. Greek reconstruction of early history.
  12. The states, and the beginnings of leagues.
- III. State and National Development in Greece to the foreign wars. 750-500 B. C.
  13. Age of colonial enterprise.
  14. Order of political evolution.
  15. Growth of Sparta; a military aristocracy.
  16. Growth of Athens; progress toward democracy.
  17. Intellectual progress of Hellas, 500 B. C.
  18. Bonds of union.
- IV. Foreign wars of the Greeks; independence, 560-479 B. C.
  19. Lydian and Persian conquests in Asia Minor.
  20. Scythian expedition and Ionic revolt.
  21. The Persian Invasion 492-479 B. C.
  22. "The Punic Invasion." 485-480 B. C. Carthaginians in Sicily.
- V. The Preeminence of Athens, 479-431 B. C.
  23. The Delian League and the Athenian Empire. 477-461 B. C.
  24. The Periclean Age and the Athenian Democracy 461-431 B. C.
  25. Intellectual life: the Athenian genius.
- VI. Wars between the Greek states; a century of strife.
  26. The Athenian attempt at land empire, 461-445 B. C.
  27. The Peloponnesian War, 431-404 B. C.
  28. The new learning.
  29. The hegemony of Sparta, 404-371 B. C.
  30. The attempt hegemony of Thebes, 371-362 B. C.
  31. The Western Greeks, 410-300 B. C. (approximately.)
  32. Literature and Art, 400-350 B. C.
  33. The rise of Macedon, 359-336 B. C.
- VII. The Empire of Alexander; "The Mingling of the East and West" 336-146 B. C.
  34. The career of Alexander; conquests, character, and achievements. 336-146 B. C.
  35. The Hellenistic period; disintegration of Alexander's empire; the Hellenistic kingdoms and Hellenistic culture, 323-146 B. C.
  36. Greece to Roman intervention; attempt at feudal government 280-200 B. C.
- VIII. Early Rome; and the Roman Republic to its supremacy in Italy. 753(?) - 264 B. C.
  37. The land and the people.
  38. Early Rome; sources of our knowledge; the legends and their value.
  39. Regal Rome; government, religion and society.
  40. The early Republic the establishment of Rome's supremacy in Latium; wars with its neighbors. 509 (?) - 286 B. C.
  41. The conquest of Italy; wars with the Samnites and Greeks; organization. 338-264 B. C.
- IX. Rome becomes supreme in the Mediterranean basin 264-133 B. C.
  42. The struggle with Carthage for Sicily; the First Punic War, 264-241 B. C.

43. "The extension of Italy to its natural boundaries"; Wars in Africa and Spain. 241-218 B. C.
44. The struggle between Rome and Carthage for the supremacy in the West; the Second and Third Punic Wars. 218-133 B. C.
45. Rome becomes supreme in the eastern Mediterranean; Conquest of Greece and Asia. 216-131 B. C.
- X. The ancient world under Roman rule during the change from the Republic to the Monarchy, 133-31 B. C.
46. The organization of Rome's foreign conquests; the provincial system.
47. The effects of conquests and the provincial system on society, politics and manners.
48. The revolutionary attempts at reform under the Gracchi, 133-121 B. C.
49. "The Rule of the Restoration"; victories of Marius; Social War 121-88 B. C.
50. The struggle between Marius and Sulla; reestablishment of senatorial rule. 88-79 B. C.
51. Pompey and Caesar; affairs in the East and at Rome; Caesar in Gaul; Civil War. 79-44 B. C.
52. The rule of Caesar, 48-44 B. C.
53. The struggle for the succession. 44-31 B. C.
54. Roman culture and society in the "Ciceronian age."
- XI. The ancient world under the Roman Empire, 31- B. C.-375 A. D.
55. The establishment of the empire; constitution; frontiers. 31 B. C.—A. D.
56. The Julian and Flavian Caesars, 14-96 A. D.
57. The Roman Empire under the Good Emperors, 96-180 A. D.
58. The Roman Empire under the Soldier Emperors, 180-284 A. D.
59. The Roman Empire under the Absolute Emperors, 284-375 A. D.
60. The rise and triumph of Christianity.
- XII. The transition period from ancient to medieval history, 376-800 A. D.
61. The invasions, and the fall of the Western Empire, 376-476 A. D.
62. The West; continued invasions, and the formation of Germanic states. 476-774 A. D.
63. The East; one emperor (Constantinople); a new prophet. 476-732 A. D.
64. "The Rise of the Christian Church."
65. The growth of the Frankish power; a new emperor. 486-800 A. D.
66. Retrospect, from the Euphrates to the Rhine.
67. The decline of the Carolingian empire and the formation of separate monarchies.
68. The beginnings of feudalism.
- XIII. The invasions by the Northmen.
69. The Northmen in Italy, France, Russia.
70. The Northmen in England.
- XIV. The papacy and the beginnings of the new German-Roman Empire.
71. Germany to the death of Otto the Great, 973.
72. The struggle of the right of Investiture to 1122.
73. Fredrick Barbarossa, 1152-90.
74. Innocent III and his position in Christendom, 1198-1216.
75. Fredrick II and the Fall of Hohenstaufen.

- XV. The formation of France.
  - 76. The rise of the Capetain dynasty to 1180.
  - 77. France under Philip Augustus and St. Louis, 1180-1270.
  - 78. Philip the Fair, 1285-1314, and Pope Boniface VIII, 1294-1303.
- XVI. Norman England 1066-1154.
  - 79. The establishment of Norman rule.
  - 80. The Church and the Crusades.
  - 81. Life in the feudal period.
- XVII. England under the Plantagenets, 1154-1377.
  - 82. England and France.
  - 83. Ireland, Wales and Scotland.
  - 84. Constitutional development.
  - 85. The Church.
  - 86. Commerce and manufactures.
  - 87. Life in Plantagenet England.
- XVIII. The East and the Crusades.
  - 88. The East before the Crusades.
  - 89. The Crusades.
  - 90. End of the Crusades.
- XIX. The era of the Renaissance, 14th and 15th centuries.
  - 91. Germany and the empire.
  - 92. France in the 14th and 15th centuries; the Hundred Years War.
  - 93. The last of the Plantagenets in England; War of the Roses.
  - 94. Consolidation of Spain into a powerful monarchy.
  - 95. Political and social conditions in Italy in the 14th and 15th centuries.
  - 96. The beginning of the Renaissance in Italy; the revival of learning.
  - 97. The fine arts during the Renaissance.
  - 98. The age of great discoveries and inventions.
  - 99. Reform movements of the 15th century.
- XX. The Protestant revolt and the wars of religion.
  - 100. The eve of Protestant revolt in Germany.
  - 101. The Lutheran revolt to 1525.
  - 102. Charles V and the Protestant Revolt in Germany, 1526-55.
  - 103. John Calvin and his work.
  - 104. Rise of Protestantism in France.
  - 105. France under Henry IV.
  - 106. The Catholic reformation and the Jesuits.
  - 107. The revolt of the Netherlands, 1568-1648.
  - 108. The Thirty Years War.
- XXI. The reformation in England; the Tudors, 1485-1603.
  - 109. The establishment of centralized monarchy.
  - 110. Extension of national power abroad.
  - 111. The Church of England and the rise of Puritanism.
  - 112. Trade and colonies.
  - 113. Life in Tudor England.
- XXII. The Puritan Revolution and Royalist reaction in England, 1603-88.
  - 114. Division between Kings and Parliament.
  - 115. Civil War and Commonwealth.
  - 116. Restoration and revolution.
  - 117. England and the continent.
  - 118. Ireland.
  - 119. Commerce and the colonies.
  - 120. Religious intolerance and sectarianism.
  - 121. Life and literature.

## XXIII. Colonial England, 1497-1760.

122. Explorations and early settlements before Jamestown.
123. Virginia, a typical southern colony.
124. Maryland, the Carolinas and Georgia.
125. Beginnings of the colonization of New England.
126. Early Massachusetts.
127. New England, 1636-70.
128. New York.
129. Pennsylvania.

## XXIV. The ascendancy of France and the age of Louis XIV.

130. Richelieu and Mazarin and the establishment of the absolute monarchy.
  131. Louis XIV and his court, 1661-1715.
  132. The people; Colbert and his reforms.
  133. The wars of Louis XIV.
- General summary and review.

**B. MODERN HISTORY**

(One unit)

- I. Introduction to modern history (the 18th, 19th and 20th centuries.)
  1. Discoveries and colonization.
  2. The Church; the Protestant revolt; the Jesuits.
  3. The manorial system.
  4. The guild.
  5. Feudalism.
  6. The absolutism of Louis XIV.
- II. The balance of power in Europe and struggle for colonial supremacy.
  7. England's preparation for the struggle.
  8. The exhaustion of France.
  9. Conflicts in Europe and in India.
  10. Conflicts between English and French colonies in America.
- III. The rise of Russia and Prussia in the 18th century.
  11. Formation of the Russian Empire, Peter the Great.
  12. Expansion of Russia in the 18th century.
  13. Beginnings of the Prussian state.
  14. Frederick the Great, 1740-86.
  15. Frederick the Great in peace.
- IV. French Revolution 1789-95.
  16. Abuses and evils of Old Regime.
  17. Growth of Revolutionary spirit before 1789.
  18. Louis XVI (1774-93) and attempts at reform.
  19. The beginnings of the French Revolution and the destruction of the Old Regime.
  20. The attempt to make a constitution 1789-91.
  21. The failure of the constitution and the fall of the monarchy 1791-92.
  22. The first French Republic and the war against Europe, 1792-93.
  23. The reign of Terror, 1793-94.
- V. Napoleon Bonaparte and the Napoleonic Wars.
  24. France in 1795.
  25. General Bonaparte in Italy and Egypt, 1796-99.
  26. Bonaparte as consul, 1799-1804.
  27. Napoleonic Empire, 1804.
  28. Napoleon's campaigns from Austerlitz to Tilsit, 1805-7.
  29. The national uprising against Napoleon, 1808-12.
  30. The downfall of Napoleon.
  31. Napoleon constructive work.

- VI. The Congress of Vienna and the policy of reaction and repression.
  - 32. The Congress, 1814-15.
  - 33. Greek War for Independence, 1821-29 and other movements in southern Europe.
  - 34. The Paris Revolution of 1830.
- VII. The Industrial revolution and the economic development of European countries.
  - 35. The stationary state of industry from the decline of Roman Civilization to the modern age.
  - 36. Coal, steam, iron.
  - 37. Beginnings of steam power.
  - 38. Spinning and weaving machinery.
  - 39. The cotton gin: Eli Whitney.
  - 40. Improvements in transportation.
  - 41. The factory system.
  - 42. Industrial combinations.
  - 43. A new power, electricity.
  - 44. Banks, banking and credit.
  - 45. Transformation of commerce.
  - 46. The influence of the industrial revolution.
- VIII. Reform movements in England and her possessions.
  - 47. The old Regime in England.
  - 48. Parliamentary reform.
  - 49. The Irish question.
  - 50. Canada; the Rebellion of 1837.
  - 51. Taxation and trade.
  - 52. Industrial progress and reforms.
- IX. Revolutionary movements of 1848.
  - 53. The preparations for revolution.
  - 54. France.
  - 55. Italy
  - 56. Germany.
  - 57. Austria.
  - 58. Summary of results.
- X. Wars for national unity.
  - 59. The unification of Italy.
  - 60. The unification of Germany.
- XI. France under the Second Empire and the Third Republic.
  - 61. The coup d'etat of President Napoleon and the Second Empire.
  - 62. The Franco-Prussian War and the Third Republic.
  - 63. The government of France today.
- XII. The Empire of Germany.
  - 64. The ascendancy of Prussia.
  - 65. The government of Germany today.
- XIII. Austria Hungary since 1848.
  - 66. The humiliation of Austria.
  - 67. The government of Austria Hungary today.
- XIV. England since 1848.
  - 68. Political and social reforms and industrial decline.
  - 69. The government.
  - 70. The colonies and their government.
  - 71. Literature.
  - 72. Social conditions.
- XV. The Russian Empire in the 19th Century.
  - 73. The development of Russia in the 19th century.
  - 74. The present government of Russia.

- XVI. The Near East Question.  
 75. Turkey and the Eastern Question.  
 76. The Turkish Revolution of 1909.
- XVII. Europe in Asia.  
 77. Review of early European explorations.  
 78. England's East India Company.  
 79. The Australian colonies.  
 80. France in Asia.  
 81. Holland in Java.  
 82. Russia in northern Asia.  
 83. China and the European invasion.  
 84. Japan and the European invasion.  
 85. Contract between governments of Japan and China.
- XVIII. Europe in Africa.  
 86. The Dark Continent.  
 87. The French in Northern Africa.  
 88. The English in Africa.  
 89. Other European nations in Africa.  
 90. The general partition of Africa.
- XIX. North and South America.  
 91. European control.  
 92. Spain's colonies.  
 93. Brazil.  
 94. Industrial advance of Latin America and the relations of the United States to her southern neighbors.
- XX. Contemporary Europe.  
 95. Alliances of European powers.  
 96. Armaments of Europe.  
 97. Changing social conditions.  
 98. Governments.  
 99. Transportation and communication.  
 General summary and review.

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- Motley, John Lothrop. Rise of the Dutch Republic. Dutton. 3 vols.
- Schwill, Ferdinand. Political History of Modern Europe. Scribners.
- Terry, Charles Sanford. A Short History of Europe from the Dissolution of the Holy Roman Empire to the Outbreak of the German War. Dutton.

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The following sets on modern history are recommended:

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Larned's History for Ready Reference. C. A. Nichols Co.

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Shideler, E. H. Course in Modern Social Problems for the High School. School Review, 28: 615-26; Oct. '20.

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Davis, Calvin O. Citizenship and the High School. Educational Review, 61: 214-23. March, '21.

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The following recent books on world history from the adult's standpoint should be on every teacher's desk:

Van Loon, Hendrick. The Story of Mankind. Boni & Liveright.

Wells, H. G. The Outline of History. MacMillan. 2 vols.

**UNITED STATES HISTORY**

(One-half unit.)

In spite of the fact that a good many authorities on American History are of the opinion that at least a year should be devoted to American History, in the high school, a semester is the rule. There does seem to be an incongruity between two years (seventh and eighth) in the elementary school devoted to history and a half year in the high school. The texts in high school history are so long that assignments have to be long and little outside work is possible. It goes without saying, then, that there ought to be the most rigid economy of time in the high school course in American History. The teacher should guard against spending too much time on the period of discovery and explorations, colonization, and the Revolution. At least twenty five per cent of the time should be devoted to the history since the Civil War. Five lines of development should be traced: political, territorial, commercial, industrial, and social. Do not let the discussion of minor and immaterial details cloud the main points but control the discussion. If your recitations are socialized, make sure that no time is wasted. If the teacher hopes to make history illuminative, he must KNOW the present, not merely have an opinion of it. Applications of the past to the present can be made only by studying and knowing both.

In no sense should the high school course in the subject be a review of the work of the elementary school, but essentially a different course, a broader and a more critical course. Propaganda should be very carefully excluded, and yet it is desirable that the student get both viewpoints of contending parties in the history of our Republic, but the important thing for the teacher and student is to get an appreciation of the ENFOLDMENT OF THE AMERICAN IDEAL. In this connection, the teacher is referred to Power's, *The American Era* and *American Ideals* (Published by McClurg.)

**Beginnings, 1492-1760.**

- I. The Period of discovery and colonization.
  1. The land; its resources and inhabitants.
  2. The period of discovery and colonization.
- The Formative Period of the Nation, 1760-1829**
- II. The period of the Revolution, 1760-83.
  3. Important developments in the colonies down to 1775.
  4. The underlying causes of the American Revolution, especially the economic causes.
  5. Surface or precipitating causes of the Revolution.
  6. Chief events and result of the Revolution.
- III. The critical period, 1783-89.
  7. The Articles of Confederation.
  8. The Constitution.
- IV. Political development, 1789-1829.
  9. The Federalist supremacy.
  10. Supremacy of the Jeffersonian Republicans, 1801-17.
  11. Political reorganization. The Bill of Rights.
- V. Social, economic and industrial development, 1760-1829.
  12. Growth of the nation in states and territory.
  13. The development of commerce.
  14. Industrial progress.
  15. Social conditions.

The testing period of the Union; A conflict of social and political ideals marks material and intellectual progress.  
1829-1865.

- VI. Political history 1829-65.
  16. National democracy—"The Jacksonian Epoch," 1829-41.

17. Twenty years of political conflict over the extension of slavery to the triumph of the Republican party, 1860.
18. Secession and Civil War.
- VII. General progress, 1829-65.
  19. Territorial growth.
  20. Commercial development.
  21. Industrial growth.
  22. Social progress.
- Reconstruction and Reunion—Recuperation and Expansion. 1865**
- VIII. Political history, 1865
  23. Reconstruction; political problems, national and sectional.
  24. Principal lines of development in domestic politics, 1871 to the present.
- IX. General Progress.
  26. Territorial expansion.
  27. American commerce.
  28. Industrial growth.
  29. Social progress.
  30. America and the World War; Reconstruction problems.

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 Fiske, John. *The Discovery of America*. 2 vols. Houghton.  
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 Thawites, R. G. *The Colonies. 1492-1750*. Longmans.  
 Hart, Albert Bushnell. *Formation of the Union, 1750-1829*. Longmans.  
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 Burgess, John W. *The Civil War and the Constitution*. Scribners.  
 Wilson, Woodrow. *Division and Reunion. 1829-1889*. Longmans.  
*Messages and Papers of the Presidents*.  
 Lippincott, Isaac. *The Economic Development of the United States*. Appleton.  
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 Fiske, John. *The Critical Period of American History*. Houghton.  
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 Willoughby, W. E. *Territories and Dependencies of the United States Century*.  
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 Parkman. *The Struggle for a Continent*. Little Brown.  
*Riverside History of the U. S.* 4 vols. Houghton.

**CIVICS**

(One-half unit.)

In the teaching of Civics, the following aims are most prominent:

- I. To increase the intelligence of the pupils in regard to:
    1. Government in general and our own government in particular, bearing in mind all the while that our government is a Republic representative in form and not a Democracy.
      - a. The essence of government in cooperation, or union of effort for the common good.
      - b. The government helps the individual to do that which he cannot do unaided.
      - c. Necessity for government grows out of our dependence upon one another satisfying our daily needs.
    2. Individual benefits arising from our institutions.
    3. Principles of self-government and advantages and needs of self-government as shown in over a century of experiment.
    4. Cost of each institution in the efforts and sacrifices of past generations through centuries of time.
    5. Organization of the community in which the pupils live.
      - a. How to gain a better understanding of its life.
      - b. How to gain a wholesome attitude toward its problems.
    6. Duties of a citizen and fundamental principles upon which they rest.
  - II. To inspire the pupils with high ideals in regard to political conduct, and to furnish stimulus toward that action which they know to be right and for which they possess adequate strength.
    1. Make them realize that they are citizens now and are a part of the experience of the future whose duty it will be to organize a new and administer government.
    2. Make them feel the responsibility of all citizens for whatever is done in their community.
    3. Make them feel that any person who is unwilling to make some personal sacrifice for the community or to do faithfully and cheerfully the part assigned him is an ingrate and an enemy to advancement and progress.
    4. Make them see the consequences of indifference to public affairs.
    5. Make them realize that intelligent honesty of purpose is a guarantee of good government to a far greater extent than model constitutions and charters.
  - III. To inculcate in pupils the habit of performing civic functions daily.
    1. To be obedient to government officials.
    2. To be orderly and industrious in school work so as to increase the efficiency of the school, which is one of the government's institutions.
    3. To be careful in the use of school property so as to lower the tax rate.
    4. To help beautify and to refrain from disfiguring the school grounds.
    5. To deal honestly and fairly with classmates and fellow students.
    6. To show a spirit of helpfulness to all in the school community.
- Suggestions for the Presentation of this Subject:
- I. Teach the functions of government or what it does before the machinery of it, and base instruction upon the pupil's experience.
  - II. Make all instruction as concrete as possible in order that it may be understood, digested and assimilated.

- III. Make room for the practical topics connected with local government, because that is at present the weakest part of our government.
  1. Procure the city manual, reports of the various departments, copy of the charter, etc.
  2. Train pupils in the intelligent use of the sources of information mentioned in (1).
- IV. Connect current topics with the lessons in civics and encourage pupils to keep up with the news.
- V. Contrast the present function of each institution:
  1. With the way in which it used to be performed.
  2. With the way in which it ought to be performed.
- VI. Discourage indiscriminate fault-finding.

### References

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- Joseph Story, Thos. M. Cooley, *Principles of Constitutional Law, Commentaries on the Constitution of the United States*.
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- Woodrow Wilson, *The State*.
- J. A. Fairlie, *Local Government in Counties, Towns and Villages*.
- Charles Zueblin, *American Municipal Progress*.
- S. E. Baldwin, *The American Judiciary*.
- Beards, *American Government and Politics*.
- Beards, *Readings in American Government*.
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- Cleveland, Frederick A. *Organized Democracy*. Longmans.
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- Hart, Alfred Bushnell. *Actual Government*. Longmans.
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- Fairlie. *Local Government in the Counties, Towns and Villages*. Century.
- Atwood, F. W. *Back to the Republic*. Laird and Lee.
- Atwood, F. W. *Safeguarding the Ideals of the Republic*. Laird & Lee.
- Ransom, W. L. *Majority Rule and the Judiciary*. Scribners.
- Woodrull, C. R. *City Government by Commission*. Appleton.
- World Almanac.
- Statemen's Yearbook.
- Outlook, Independent, Literary Digest, Review of Reviews or similar magazines.
- Publication of numerous political organizations.
- Legislative manual of the State.
- Party Publicity Pamphlets, Campaign Text Books, A good daily paper.

### Synopsis of Course

- I. The Origin, Nature, and Purpose of Government.
  1. The evolution of the state.—Development of citizenship.
  2. The functions of government.—opposing views; individualistic; paternalistic; socialistic. Forms of government.
  3. Purpose of our system of government. Study from basis of the Preamble of the Constitution.
- II. Study of the Origin, Organization and Functions of the Township and County.
  1. The origin of the town and the development of township government.
  2. The functions of township government, and its limitation, officers.
  3. The origin and organization of the County.
  4. The functions of county government and its limitations.
  5. The local county officers and their duties.  
(How are these officers paid for their service?)
  6. Common School Districts—their structure, powers and limitations. School district officers. On the organization and management of school districts consult the School Laws of South Dakota.
  7. Independent school district—how organized and governed.
  8. Township High Schools.
- III. City Government.
  1. Growth and development of American cities. Resulting problems.
  2. Plans of government. Officials and organization under each plan.
  3. The office of mayor,—legislative, executive and judicial powers.
  4. The various departments of city government.
  5. Police powers. What is involved therein?
  6. Services rendered by a City Government.
    - a. Streets and other public improvements.
    - b. Public utilities.
    - c. Public health, relief of needy,—amusement parks, play grounds.
  7. Questions of municipal ownership of public utilities.
  8. Public school systems.
- IV. State Government.
  1. The origin of our state governments—form of government adopted.
  2. Departments of state government:
    - a. The executive, powers of, duties of—
      1. The position of governor—qualifications, responsibility.
      2. Legislative and judicial powers of the governor. Political duties.
      3. Other principal executive officers and boards. Note what is common to all the states, exceptions in some states, and the special arrangements for South Dakota
    - b. The Judicial Department.
      1. The courts—superior and inferior. Jurisdiction.
        - a. Establishment of Justices, methods and forms of trial, equity and writs.
        - b. Judges, their terms, Qualifications.
        - c. The jury system.
      2. The interpretation of law. Jurisprudence.
      3. Protection of individual rights.

- c. The Legislative Department.
    - 1. House of the legislature, qualifications and terms of members.
    - 2. Business of the legislature.
    - 3. Process of law-making.
    - 4. Direct legislation—Initiative and referendum.
  - d. The Police Power of the State.
  - 3. State Care of the Public Welfare.
    - a. Punishment of crime. Prison policies, parole, indeterminate sentences, juvenile courts.
    - b. Public charities.
    - c. Regulation of enterprises such as the liquor traffic. Discuss the cause of pauperism and crime.
  - 4. Supervision of Commercial Interest.
    - a. Transportation.
    - b. Labor and Industry.
  - 5. Financial system—Assessment and taxation.
- V. The Federal Government.
- 1. The developments leading to our federal union.
    - a. The New England Confederation.
    - b. The Albany plan of union.
    - c. The Stamp Act Congress.
    - d. The "Continental Congresses" and the Articles of Confederation. Failure of the Confederation. Why?
  - 2. Evolution of the Constitution. Compromises. "Bill of Rights." (Review the Preamble.)
  - 3. Relation of the Federal Government to the states. Strict and loose construction. Centralization of power.
  - 4. Constitutional changes since its adoption.
  - 5. What states may and may not do. What the Federal Government may and may not do.
  - 6. The dual nature of citizenship.
    - a. Rights of United States citizenship.
    - b. Rights of state citizenship. Privileges of both.
    - c. Naturalization.
  - 7. Foreign Relations.
    - a. International law—America's Foreign Policy.
    - b. The diplomatic and consular service—appointments, qualifications, terms of service, salaries, general duties.
    - c. Regulation of commerce.
    - d. Treaties.
  - 8. The national defense. Army, navy, fortifications, coast defense.
  - 9. The National Financial System.
    - a. Forms and methods of taxation.
    - b. Management of the national finances, methods of borrowing, bonds, treasury notes and Federal Reserve Notes.
  - 10. The monetary system—Currency Reform. Federal Reserve Banks.
  - 11. The public lands—Conservation and natural resources.
  - 12. Internal revenue.
  - 13. The postal system.
  - 14. Various activities "for the public welfare."
- VI. Governmental Departments
- 1. Congress, Senate, House of Representatives. Qualifications of members and terms.
    - a. Congressional methods and sphere of authority.
    - b. Powers—express and implied.
    - c. Organization of each house.

## VII. The Executive Department.

1. The president—qualifications and methods of election. (Study party organization.)
2. The Executive Departments—Cabinet officers and their duties.
3. Powers of the Presidents.

## VIII. The Judiciary.

1. Federal courts. Jurisdiction of each. Judges, how selected, terms, salary, etc.
  - a. Relation of these courts to the states.
  - b. Importance of Federal Court decisions. Consider "Government by injunction."

## IX. Exercise of the Franchise.

1. Qualification of a voter.
2. Political Parties—their origin and organization.
  - a. The political "machine." Rings.
  - b. The political "boss."
3. Nominating conventions.
4. Primary elections—how conducted.
5. General elections—how conducted.
6. Elective and appointive officers.
  - a. Federal, how elected or appointed.
  - b. State and local, how chosen.

Let all study be from the standpoint of a citizen of South Dakota, so that all departments of this subject shall be correlated with our state and local governments, bringing the subject into contact with the student's experience.

## ENGLISH HISTORY

(One unit).

## I. Britain to 440 A. D.

1. The land.
2. Early Britain.
3. Roman Britain.

## II. Saxon England 449-1066.

4. Saxon and Angles.
5. The Saxon supremacy.
6. The struggle against invasions.
7. Establishment of Christianity.
8. Government and life in Saxon England.

## III. Norman England 1066-1154.

9. Establishment of the Norman rule.
10. The Church and the Crusades.
11. Life of the feudal period.

## IV. England Under the Plantagenets, 1154-1485.

12. England and France.
13. Ireland, Wales and Scotland.
14. Constitutional development.
15. The Wars of the Roses.
16. The Church.
17. Commerce and manufactures.
18. Life in Plantagenet England.

## V. Tudor England 1485-1603.

19. Establishment of centralized monarchy.
20. Extension of national power abroad.
21. The Church of England.
22. The development of trade and colonies.
23. Life in Tudor England.

- VI. The Puritan revolution and the royalist reaction, 1603-88.
  - 24. The division between kings and Parliament.
  - 25. Civil war and commonwealth.
  - 26. Restoration and revolution.
  - 27. England and the continent.
  - 28. Ireland.
  - 29. Commerce and colonies
  - 30. Religious history.
  - 31. Life and literature.
- VII. Constitutional monarchy, 1688-1820.
  - 32. Establishment and development of constitutional monarchy.
  - 33. Relations with Scotland and Ireland; the Jacobites.
  - 34. Conflicts with France on three continents.
  - 35. The colonies.
  - 36. Manufactures and commerce; the industrial revolution.
  - 37. The Wesleyan movement and other reforms.
  - 38. National life, learning and literature.
- VIII. The British Empire, 1820 to present.
  - 39. Parliamentary reform.
  - 40. Government in England at the present time.
  - 41. Taxation and trade.
  - 42. Industrial progress.
  - 43. Colonies.
  - 44. Foreign affairs.
  - 45. Ireland.
  - 46. Literature and science.
  - 47. Social conditions.
  - 48. England in the World War.
  - 49. General Summary and Review.

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- Creighton. Mandell. Age of Elizabeth. Scribners.
- Taswell-Langmead, T. P. English Constitutional History. Houghton.
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- Trail, H. D. and Mann, J. S. (ed). Social England. 12 vols. Putnams.
- Moberly, C. E. Early Tudors. Scribners
- Gardiner, Samuel R. Houses of Lancaster and York. Scribners.
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- McCarty, Justin. People of England in the Nineteenth Century. (Stories of the Nations.)
- Bright, J. Frank. A History of England. 5 vols. Longmans.
- Cheyney, E. P. Readings in English History. Ginn.
- Kendall, E. A. Source Book of English History. Macmillan.
- Gardiner. Student's History of England. Longmans.

#### ECONOMICS (One-half unit)

It is increasingly plain that the most important phase of the reconstruction problem of the world is the economic phase. It is becoming vitally necessary that our people learn to understand and appreciate the conditions underlying prosperity. The sooner young people are introduced to the fundamental principles determining these conditions, the better. Usually training in thinking in terms of political economy is postponed too long.

Some exceedingly valuable ideals may be developed in connection with the study of economics. No struggle is so bitter and hard as the struggle for a living. No hatreds and prejudices are so strong as hatred of economic classes, e. g., labor and capital. The sane view and broad outlook of the student will do much to counteract hatred and radicalism bred partly by misconception, prejudice and positive misunderstanding. Respect for property and money, after a proper appreciation of the sacrifice and labor involved in their acquisition should be forcibly impressed, and it is likely that the student will get a new appreciation of the dignity of labor. Thrift can be correlated with economics very conveniently.

One fundamental warning should be sounded to all teachers of economics: Do not attempt to do too much. The following, however, may be suggested as not only possible, but essential even in a half-unit course: Pupils should keep a notebook primarily for recording material supplementing the text, whether gleaned from collateral reading, special reports of other students, or lectures by the teacher. At least one carefully prepared essay (possibly a term paper) should be written by the student. This should be a test of the student's ability to apply the science of economic laws and principles to his environment. Some research work of small difficulty should be entailed. Possibly with the arrangement of the English department this essay might be given credit in that department also. By means of a bulletin board and some newspapers some very interesting material may be gathered by the students during the semester. Graphic material and statistics may be introduced and some elementary study made of the value of such material and its interpretation.

### Outline

I. Introduction. Economics as a social science. Economics as a science and as an art. The fundamental institutions of the existing socio-economic order. The divisions of economics: consumption, production, exchange and distribution. Finance, socialism, communism and single tax.

II. A brief survey of economic history. The functioning and structure of medieval industrial society; the self-sufficient medieval English manor; medieval towns and manufactures; merchant guilds and craft guilds; beginning of cooperation through exchange; beginning of capitalistic agriculture and manufacture; rise of the modern organization of trade and commerce. The Industrial Revolution in England. The Industrial stage in the United States.

III. Consumption. The characteristics of human wants. Law of diminishing utility. Law of marginal utility. Buyers' and sellers' surplus, demand, supply and price. Market value and normal value. Market price and normal price. Elasticity of demand. Harmful and unwise consumption. Thrift. Substitutes.

IV. Production. The factors of production—land and labor, (primary) capital and the skill of the enterpriser (entrepreneur), Specialization (division of labor). Large and small scale production. Land as a productive factor; natural resources in the United States. The law of diminishing returns. Nature and sources of capital; nature of capitalistic production. Force of industrial organization. Classification of capital: fixed and circulating, free and specialized. Merchantilism vs the laissez faire theory. Concentration of industry. Competition vs. monopoly; the determination of monopoly price. The formation of trusts, anti-trust legislation in the United States.

V. Transportation. Natural waterways, wagon roads, canals and steamboats developed before the railroad came. Hard surface

roads the latest development in American transportation. The possibility of the development of aerial travel. The railroads; their development; present status; recent tendencies. Rate making. Government regulation of railroads.

VI. Exchange. Direct and indirect forms of marketing. The middleman in industry. The government and monopolies. Patents, trademarks, copyrights and labels. The regulation of public utilities. Price fixing. Money; its functions and forms. Monetary laws. The quantity theory. Gresham's law. Elasticity of money. Bimetallism. A brief monetary history of the United States. Domestic and foreign commerce.

VII. Tariff of the United States. Historical sketch. Basis of free trade; economic arguments for and against protection; relation of protection and nationalism. The probable future policy of the United States.

VIII. Distribution. Connection between prices and the social income to the distributed. Wages. The return to labor. Standard of living and wages. Minimum wage laws. Methods of wage payment, profits sharing. Organized labor and labor disputes. Compulsory arbitration and labor legislation. Immigration and labor. Rent; the return to land. Urban and agrarian rents. Rents and prices. Interest. The return to capital. Why interest is paid and how much; variations in the essential interest rule. Competitive profits; the return to the enterprises. Causes of profits. Prices and profits. Speculation and unearned increments. Cooperation and profits.

IX. Plans of economic reforms. Socialism, advantages and objections. The system of Karl Marx nationalization of land. Single tax. Cooperation and profit sharing. Social insurance. Workman's compensation.

X. Progress of economic thought. A brief survey of the principal contributions made to science and art of political economy. The Ancients: Aristotle, Cicero and Columella. The middle ages. Merchantilism superseded by the theory of the Physiocrats. Adam Smith founder of the modern school. Malthus; Ricardo; John Stuart Mill; Nassau William, Senior; Jeremy Bentham. The classical school in France and Germany. Critics of the classical school, critics of individualism, critics of free trade and socialist critics (Robert Owen). The historical school. The psychological school. Modern socialism. Economic thought in the United States.

### ECONOMICS BIBLIOGRAPHY

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 The Real Wealth of Nations, John Hecht, World Book Co.  
 Our Economic Organization, Marshall and Lyon; Macmillan.  
 Introduction to Economics, Henry R. Saeger, Holt.  
 Principles of Economics, 2 vols., F. E. Taussig, Macmillan.  
 Principles of Political Economy, J. S. Nicholson, Macmillan.  
 Modern Industrial Movements, Daniel Bloomfield; Wilson Co.  
 The Closed Shop, Lemar T. Beman; Wilson Co.

Statistical Report of the United States.

Reports of the various departments of the Federal Government and State departments.

World Almanac.

Labor Problems, Adams and Sumner; Macmillan.

History of Economics, Cessa; Macmillan.

Contemporary Socialism, Rae; Scribner.

Reports of the Departments of Labor, Commerce, Treasury and Interior.

Organized Labor, Jno. Mitchell; American Book Co.

Railway Problems, Ripley; Ginn & Co.

The Evolution of the Modern Capitalism; Scribners.

The Economics Basis of Protection, Simon Patten; Lippincott.

Wealth of Nations, Adam Smith; Colliers Harvard Classics.

Industrial Evolution, Ducher; Holt.

The ABC of Foreign Exchange, Clare; Macmillan.

Trust Finance, Meade; Appleton.

### SOCIOLOGY

(One-half unit)

In conformity with the recommendations of the committee of the American Sociological Society, it would be well to have sociology or a course in social problems, as it is perhaps more properly called, precede a course in economics.

The fact that many high schools within the last few years have taken up the study of elementary sociology is perhaps traceable to the appeal during the war for more and better training in social science. But rather is the reason to be sought in the increasing stress during the past decade or more upon the social sciences. The past century was characterized by great progress in the physical sciences. This progress still goes on; but the indications are that the present age will witness still greater development in social science, in the control of social forces, and readjusting social lines.

If the present social crisis is to be passed successfully, it will be imperative that there be built up sound and scientific thinking about social problems. The aim of this course should be to serve as an approach to such study in later life as will make this type of thinking possible.

High school sociology is still in the experimental stage, but results have already convinced many students of education that unless poor teaching throws the subject into disrepute, the course will be more common in American high schools.

No teacher should attempt to give instruction in this subject who has not had at least one good course in general sociology in college. This should be enlarged upon by means of extensive reading on the part of the teacher. It is fully as necessary that the teacher do outside reading as that the student should do it.

Duplication of the subject matter in civics, economics or history should be avoided in this course. As in the other social sciences, a good working library is the most essential thing in way of equipment. The local community affords many and excellent opportunities for some simple research work. This should be assigned to individual students or to small groups. Possibly some projects might be worked out by the entire class.

A recent number of the Survey, one of the very best of American publications dealing with social problems, mentions over fifty voluntary associations sending out literature on social problems. The teacher should be able to collect a mass of valuable material in this way. The publications of the government, particularly those of the Bureau of the Census, are almost indispensable.

## OUTLINE

I. The theory of evolution; its bearings upon sociology. Mental and social evolution. Life of primitive man. Heredity. Tradition.

II. The influence of natural conditions upon economic and social development; climate; soil; configuration.

III. Origin and function of the family. The home.

IV. The study of society. What is society? The bearings of psychology on society. Social psychology. Social control. Folkways.

V. Population. Present status; urban and rural; distribution. Center of population. Race nativity and sex of our American population. Illiteracy; voting strength; increase and decrease of population.

VI. Immigration. Migrations as a factor in social evolution. History of American immigration. Effects of immigration. Restriction of immigration. Oriental immigration.

VII. The American race problem. Negroes, Indians, Mongolians and Jews. Americanization and its possibilities.

VIII. The problem of the city. The problem of the country.

IX. The industrial problem. Women in industry. Child labor. Sweat shops. Labor organizations. Brief historical summary of organized labor and labor legislation. Unemployment.

X. Poverty and pauperism. Its causes. Relation of poverty and pauperism to degeneracy. Charity and poor relief; its history. The alms house. Outdoor relief. Social settlements. Care of dependent children.

XI. The problem of crime. Extent and cause of crime. Classification of crimes and criminals. The cost of crime to society. The treatment of crime. Prison reform, juvenile courts and reformatories.

XII. Marriage and divorce.

XIII. Defectives in society. The problem of feeble-mindedness. Insanity. Epilepsy. The deaf and blind.

XIV. The prohibition problem.

XV. Education. The rise of the school. Moral progress and the school. The church and the school. The church and state. Why does the state maintain a system of public education? The present status of our school system.

The above outline is divided into fifteen parts of as nearly equal time importance as possible. It is suggested that the teacher devote in the neighborhood of one week to each of the above, leaving thus three weeks for review and examination. Care should be taken not to attempt too much elaboration. It is very easy to wander too far afield in this subject. While collateral reading is advisable, necessary care should be taken in its selection as material that is too difficult should be avoided. The daily papers and magazines will afford much material for discussion and for illustrative purposes. There are but a few satisfactory texts in this subject as yet. Possibly a well prepared teacher could give the course without a text book, but that is an experiment which involves the highest skill on the part of the teacher. It is strongly urged that schools giving a course in economics give one in social problems also. The two together serve admirably as preparation either for college courses in these subjects or for solving the social and economic problems in life.

**SOCIOLOGY REFERENCES**

- American Social Problems, Burch and Patterson; Macmillan.  
Social Problems, Towne, Ezra T.  
General Sociology, Small, Albion W.; U. of Chi. Press.  
Outlines of Sociology, Blackmar and Gillin.  
Outlines of Sociology, F. H. Giddings; Macmillan.  
Sociology and Modern Social Problems, Charles Elwood; American Bk. Co.  
Studies in American Race Problems, Alfred Holt Stone; Doubleday Page.  
The Anatomy of Society, Gilbert Cannon; Dutton.  
Immigration, Edith M. Phelps; H. W. Wilson Co.  
Sociology and Social Progress, Thomas N. Carver; Ginn & Co.  
Social Problems, Albert B. Wolfe; Ginn & Co.  
Educational Sociology, Wm. E. Chancelor, Century.  
Social Unrest, Lyman P. Powell; Review of Reviews Co.  
The Survey or some magazine of that nature.  
American Journal of Sociology.  
Socialism and Social Movement, Warner Sombart.  
Dutton Statistical Abstract of the United States.  
American Yearbook, Appleton.  
World Almanac.

## VOCATIONAL COURSES

### AGRICULTURE

(One unit.)

Like all other subjects in this division, agriculture requires laboratory work. About two fifth of the time allotted to the study of agriculture should be devoted to work in the laboratory. Much supplementary work in the nature of assigned readings, observation trips and visits to well organized farms should be given.

The school should not attempt to conduct an experiment plot unless provision can be made for thoroughly caring for it during the entire season. In some cases, the securing of one or more plots from neighboring farmers with the understanding that the farmers provide the necessary team work on the plots may be found practical.

It is not intended that the outline here given should be followed exactly, as the order of study will necessarily depend upon the varying conditions in different localities. The outline, therefore, is only suggestive. Sixty experiments should be the minimum required in laboratory work and note books should be graded as in other laboratory subjects.

The following subjects are suggested for study:

Conditions necessary for plant growth: moisture, warmth, plant food, mechanical support.

Food necessary for plant growth: organic, mineral.

Origin of soil and the agencies of formation.

Physical properties of soil: soil water and its control, drainage and tillage.

Organic matter of soils; its preservation and increase.

Study of corn botanically, history of development, scoring and selecting. The same study applied to oats, wheat, barley, potatoes and alfalfa.

The treatment of seeds subject to rust, smut and scab.

The study of vegetables and gardening.

Care of fruits characteristic to locality.

Spraying for insect pests and fungous diseases.

The harvesting and marketing of grains and fruits.

Animals: breeds of horses, beef and dairy cattle, sheep, swine, and poultry.

Attention should be called to the matter of making silage and its value as a feed.

Practice in securing soil samples.

Collection of types of soils.

Determining effects of drainage and slope on temperature of soils.

Determination of effect of temperature on germination of seeds.

Determination of effect of depth of planting on germination of seeds.

Determining water holding power of various soils.

Collect, name and tabulate at least twenty-five weeds of community.

Get sample of clover, alfalfa and timothy seed and examine for weed seeds by comparison with standard collection. Determine percentage of purity.

Test vitality of clover, alfalfa, corn and oats.

Test various seeds.

Examine plants of wheat and other cereals, as to arrangement of spikelets, number and arrangement in each head.

Determine average number of leaves to plants of corn, and amount of leaf surface.

Study clover and alfalfa plants botanically.

Treat various grains for fungous diseases.

Determine effect of temperature on germination of seeds such as clover, beans, melons, cabbage, wheat, corn and oats.

Determine grades of various samples of grains.

Procure score cards and score corn, wheat and oats.

Laboratory work in connection with Animal Husbandry will be primarily the scoring and judging of various animals and testing milk.

References should be made to farm management, especially as to the choice of land, labor, business management, marketing, records and expenditures, the modern home, convenience and desirability.

### BIBLIOGRAPHY

1. Essentials of Agriculture (Waters), Ginn & Co., Chicago.
2. Nature Study Agriculture (Skilling), World Book Co., Yonkers on Hudson, New York.
3. Field Crops (Wilson and Warburton), Webb Publishing Co., St. Paul, Minn.
4. Farm Papers, State and U. S. Dept. of Agri., Washington, D. C., Bulletins.
5. Dairy Farming (Eckles and Warren), Macmillan Co., New York.
6. Farm Friends and Farm Foes (Weed), Heath and Co., Chicago.

### HOME ECONOMICS

The purpose of this department is to teach girls the simple processes necessary to efficient home making. This will include instruction in feeding and clothing the family, care of the sick and of children, management of the home, laundry, economical expenditure of the income, selection of the home, its equipment and furnishing. It is important that the course should include instruction concerning the opportunities and responsibilities of women as citizens.

Classes in Home Economics should meet daily, a double period being allowed for the work. The plan which provides for work in foods and clothing to be offered on alternate days is not generally satisfactory. It is much better to offer the work in alternate semesters or quarters (nine weeks). Still better is the "unit plan" by which the work is offered in short units, varying in length according to the content of the unit, i. e., garment making, meal preparation, laundry and care of the sick.

### STUDY OF FOODS

The aim of this phase of Home Economics is to give the girls training that will enable them to select, prepare and serve balanced meals, taking into account the needs of the group and considering economy of time, money and effort. The preservation of foods is of great importance and should be included in the course.

The plan of work and method of presentation must be adapted to the needs of the group being taught, but should include the following:

1. Kitchen and equipment. Selection, use, care, methods of cleaning.
2. Skill in manipulation. Accurate measurements, neatness, good management, ability to judge finished product.
3. Classes of foods. Examples, composition, digestion, uses, principles of cookery.
4. Food preservation. Canning, drying, pickling.

5. Preparation and serving of meals. Emphasis should be laid on family service and very little time given to formal or elaborate serving.
6. Marketing. A knowledge of source, manufacture and food value of food products is necessary in order to market wisely.
7. Dietetics and nutrition.
8. Invalid cookery. (May be offered in Home Nursing course.)

### CLOTHING

The work in clothing should enable the girls to:

1. Interpret, alter and use simple commercial patterns.
2. Use the sewing machine and its attachments.
3. Do practical hand work (basting, hemming, button holes, fastenings, seam finishes and simple decorative stitches.)
4. Understand textile fibers sufficient to be able to purchase intelligently.
5. Plan garments with knowledge of appropriateness of pattern and material to types of individuals.
6. Consider economy in the expenditures of time, energy and money.
7. Care for, repair, and remodel clothing.

The following garments are suggested as suitable for teaching the principles outlined:

1. Bags—may be used as a first problem if it seems necessary to begin on something very simple. (In many cases should be omitted from course.)
2. Kimona apron or night gown.
3. Bloomers or underskirt.
4. Middy blouse, skirt or men's pajamas.
5. Dress of wash goods (gingham for example.)
6. Wool dress—preferably a "make over" problem.
7. Children's clothing—dresses and rompers.
8. Knowledge of silk materials should be obtained by use of trimmings and the making of a simple blouse of pongee or wash silk.

It is valuable training for the girls to keep a clothing expense account. Interest is stimulated by finding the yearly average of the class. Millinery may be used as supplementary work or offered as elective to advanced classes, but is not recommended as a part of a two-year course.

### SHELTER

Since a home maker is concerned with problems of shelter as well as of food and clothing, one or more units of work should be offered which will provide instruction in:

- I. Home furnishing. Emphasis on:
  1. Color harmony
  2. Simplicity
  3. Choice and arrangement of furnishings, rugs, pictures and hangings.
  4. Wall finishes, floor coverings.
  5. Refinishings and redecorating.
- II. House Management.
  1. Cleaning.
  2. Laundry.
  3. Choice and arrangement of equipment.
  4. Labor saving devices.
  5. Plumbing, sanitation, water supply.
  6. Household budget.

### HOME NURSING AND CHILD CARE

One or more units should be offered in this line. It is not intended to make trained nurses of the girls and the instruction should include only such processes as may be successfully carried on by the home nurse such as:

1. Selecting and preparing food for children and invalids.
2. Simple sick room care.
3. First aid.
4. Bathing and dressing children.
5. Personal hygiene.
6. Sanitation and cleanliness.
7. Precautions in avoiding contagious diseases.
8. Importance of proper food and clothing.
9. Observance of simple rules of health.

### MANUAL TRAINING

(Two units.)

Manual Training was first introduced in various high schools of the country with the object of instituting thereby a course of study which would hold in those institutions the boys, who previously had been leaving school upon the completion of their grade work to take something "practical" and "remunerative."

That this object has been largely attained is evidenced by the ever increasing percentage of boys in the graduating classes of our high schools; the lads and their parents realize that, although perhaps a hardship at the time, the increased usefulness and the more rapid advancement of the boy after completion of the course more than compensates them for their necessary sacrifices. These parents are thus doing much to help raise the general standard of the trades in their community and to produce citizens who will be much less likely to be imposed upon by either labor leader or capitalist.

Still another and equally important result is being attained as a result of the insistent demand of the engineering college for a better preparation on the part of students entering and graduating from its various departments. This has made it advisable for all who enter technical schools to take with them as many advanced credits as possible for two reasons: first, because these advanced credits may be attained at much less expense while living at home and attending a free public school, and second, and more important still, the time saved by having these credits makes it possible for the student to give much more time and attention to the purely technical side of the college curriculum. It will be evident that the result of this is to make for thoroughness in college work and to produce far more capable men leaving these institutions for active professional life.

In conclusion and in general, let it be said that work in the shops and in the drafting room with the necessary careful manipulations of tools generates a habit of keen perception, confers accuracy, and stimulates a love of neatness. Properly taught, honesty is begotten, for in the making of things it is impossible to conceal the vagueness of ambiguity by ambiguity.

#### First Semester—First Year—Mechanical Drawing

Nothing but neat, accurate and artistic work should be accepted in this course. Great care should be taken that all lines and intersections are clear and accurate.

In the first semester of the first year, work such as the following should be studied:

Straight lines—Use of T-square, triangles, pencil, ruling pen, dividers and scale, conventional lines, freehand and working sketches.

Circles—Use of compasses; center lines; cross hatching.

Tangents—Location of centers and points of tangency.

Planes of projection—Elementary principles of projection; projections of simple geometric figures.

Revolution of objects—Views of objects in simple and inclined positions.

Developments—Prism, cylinder; pyramid; cone.

### **Second Semester—First Year—Woodworking**

The following uses of tools should be taught, and about in this order:

1. Measuring, squaring, sawing, boring, planing, chiseling, gauging, use of spoke shave and scroll saw.

2. Upon the introduction of new tools, throughout the course the instructor should always teach the economy of keeping tools in place, and always ready for immediate use; also instruct the students in the art of sharpening the tools used. Benches should never be left until everything is in perfect order.

3. Whenever necessary, a forty minute period should be given to a study of the different stains, fillers and other finishings; and also their general uses should be discussed and demonstrated when necessary.

### **First Year Exercises**

Laundry list, game boards, counting boards, hat rack, bread cutting board, pencil tray, hammer handle, brush rack, sleeve board, coat hanger, book rack, test tube, inclined plane, sled, bracket shelf, towel roller, and other projects as desired by class.

### **First Semester—Second Year**

Work such as the following should be studied:

Intersections—Axes in the same plane; axes in different planes, isometric and cabinet drawing.

Freehand and mechanical lettering—Placing; form; slant; spacing; stroke.

Working drawings—Furniture.

Working drawings—Machine parts.

### **Second Semester—Second Year**

Joinery—planing joints, gluing (hot and cold), clamping, mortice and tendon, mitering and general elementary cabinet making, plowing and fitting.

The following is a type of the articles that might be made, however, a number of supplementary articles will have to be supplied by the instructor according to the needs of the class:

Bread board for moulding, drawing board, stool, plant stand, taboret, umbrella rack, table, window box, picture framing, sewing cabinet, music cabinet, bookcase, and other projects desired by the class.

### **Reference Books for Manual Training**

Bench Work in Wood, W. F. M. Goss, Ginn & Co.

Correlated Courses in Wood Work, Mechanical Drawing, Manual Arts Press.

Educational Wood Working for School and Home. Macmillan.

King's Book for Teachers, American Book Co.

King's Elements of Woodwork and Construction, American Book Co.

Manual Training, J. M. Tate; School Education Co.

Problems in Furniture Making, F. D. Crawshan, Manual Arts Press.

Wood Work, S. E. Richie; American Book Co.

**Minimum Equipment for Manual Training Department****Individual Equipment**

1 Bench	1 Bench brush	1 Wood mallet
1 Back saw	1 Jack plane	1 Try-square
1 Marking gauge	1 Block plane	1 Sloyd knife
1 Hammer		

**General Equipment for Twelve Students**

3 Cross cut saws No. 10.	2 Smoothing planes.
3 Cross cut saws No. 8.	3 Oil stones.
1 Rip saw No. 6.	2 Turning saws—18 in.
1 Rabbet plane No. 50.	1 Wire scraper.
2 Cold chisels.	3 Wood files—half round.
2 Draw shaves—10 in.	1 Wood rasp.
2 Steel compasses.	1 Miter box with saw.
2 Scrool keys.	1 Oil can.
1 Keyhole saw.	8 Wood screws—small size.
5 Iron screw clamps.	2 Wood screws—large size.
1 Yankee drill and bits for same.	1 Hatchet.
1 Ratchet brace.	2 Saw sets.
2 Nail sets.	1 Dozen paint brushes.
3 Screwdriver bits—assorted.	1 Glue pot.
2 Counter sinks—assorted.	Glue, shellac, dye.
1 Scraper with two blades	1 Grindstone.
2 Steel squares.	1 Emery stone.
4 Spoke shaves.	

**PRINTING**

Each subject in a school curriculum, even though it be vocational should have a definite educational value. This is true of printing. Over nine hundred school plants are in operation in America today. It is not conceivable that nine hundred school boards could be deceived regarding the EDUCATIONAL value of printing.

In addition to being a definite part of a curriculum, printing readily dovetails into the routine of the school, and the results shown have far exceeded the expectations of all those concerned.

The art of printing embraces practically all the desirable qualities of education. It involves a good knowledge of grammar, construction, punctuation, spelling and mathematics. Constant practice in the reproduction in type of paragraphs of correct English increases the student's vocabulary and his knowledge of construction. The brain centers of sight and touch working in conjunction as they do in type setting insure effective instruction in spelling. The foundation stone of printing is mathematics, and a complete study of the point system, by which all type matter is set up, is in itself mathematical training of no mean proportions.

From the viewpoint of general qualifications, it requires patience, taste, ingenuity, and a knowledge of harmony. From a mechanical or manual viewpoint, it is most exacting.

While instruction rather than production is the aim, practically all of the printing required throughout the school can be produced in the High School plant, affording opportunities for the student to become acquainted with jobs of varying degrees of difficulty. The general printing connected with all phases of school life covers a very wide field of experience in the "Art Preservative."

The outline here submitted is for two years work. The minimum requirement, when elected, is one year. Two periods of forty minutes each are required each day. This is the equivalent, in a semester, of fifteen days of eight hours each. Four semesters work

then gives the pupil sixty days of actual experience. He will have acquired a general knowledge of the art of printing during this time and his knowledge of any special department of the work can be more easily cultivated in a commercial office should he elect to follow the art as a profession.

### FIRST YEAR

(One unit)

**First Month**—During the first two weeks, notebook work should be given consisting of: definition of printing; description of means of printing; type; rules and cuts; preparation of materials; composition; imposition; lockup and press work; description of materials used.

Second two weeks: Studying of the case. Position of characters learned by studying the empty case marked with various letters, figures and marks. Diagramming of the case helps pupil remember positions. Give a day's notebook work on justification and one on the stick and how to use it; setting to measure, holding in hand and how to place the characters. Give an examination on notebook work.

**Second Month**—Go over examination questions. Study notebook work given first month. See that pupil has definite knowledge of materials used in setting straight matter. Go over notes on justification and setting stick. Require the setting and spacing of a given line. Have pupil read the type in his stick letter by letter. Show him how to correct the errors and revise until he has it correct. Explain carefully the need of correct spacing.

After learning to set and correct a line at a time, give copy of several lines and require that they be set correctly. Stress justification. Give examination on nomenclature and description.

**Third Month**—Go over examination questions and explain thoroughly all errors. Allow student to set a paragraph giving close attention to indentation and the correction of each line as it is set. Pupil should always inquire as to direct division of words. Discourage tendency of spacing too closely. Require careful justification. See that pupil learns to read type from left to right.

Give written work on manner of emptying the stick and practical instruction using first one line, then two, etc. Let pupil distribute what he has set. Show relation of reading type properly to ease and accuracy in distribution. Give examination in nomenclature and description.

**Fourth Month**—Notebook work on the point system. Have pupil set lines of six, eight and ten point in his stick to show difference in size and length of lines. Require setting same paragraphs in different sizes to show difference in amount of space taken up by each in relation to the other. Stress justification, indentation and correction of each line as set.

Pupil should be able to set paragraphs readily and distinguish between two or three sizes of type. To require reading letter by letter will overcome tendency to read type from right to left instead of properly. Examine as before adding work on point system.

**Seventeenth and Eighteenth Weeks**.—Review. Have speed tests, scoring number of lines set and errors to determine score. Let average number of lines equal 250, grading 5 points above 250 for each line over average and subtracting 5 points for each error and each line less than average.

Pupil should be able to set straight matter and know the names of all the various materials used in the process.

## SECOND SEMESTER

**First Month**—Continue straight matter composition. Instruct in tying up type and in taking proofs. Continue work in learning different sizes of type. Have pupil set the same line in sizes from 6 to 36 points. Explain carefully the difference by points and practise determining sizes by sorting mixed type.

Explain type used for commercial work other than straight matter and start setting simple jobs. Reprint work should be given first. Work with borders, tables for ruled lines should be avoided.

**Second Month**—Job composition continued. Original jobs of a few lines may be set if instructor marks sizes and faces of type to be used on the copy. Instruct in makeup taking into consideration the stock to be used. Explain proper spacing and decoration to obtain best appearance.

**Third Month**—Student should be instructed in correcting straight matter from proofs. Care in handling type should be stressed and proper spacing after correction insisted upon. Pupil will learn proof reader's marks by practice in a short time. Glancing at copy to discover error will show error indicated by mark on proof.

**Fourth Month**—Continue work in setting simple jobs. Easy tabular work using leaders for cross lines may now be tried. Pupil should now learn various rule faces and to distinguish thicknesses of body. Distribution of jobs will assist in the pupil's learning various faces.

Student should now be able to set simple reprint jobs readily and begin to understand makeup.

**Seventeenth and Eighteenth Weeks**—Review straight matter composition stressing justification. Review of nomenclature of all materials used thus far.

## SECOND YEAR

(One unit.)

**First Month**—Job composition. Tabular and ruled work and jobs with borders may now be given. Start with reprint work. Instruct carefully in boxing border and proper makeup of job inside border. All original work must have the proper rules and type sizes indicated by the instructor.

**Second Month**—More practical work in the structure of tabular forms and ruled work. Accuracy is essential in the building up of forms. Practical demonstrations in lockup may now be given. Single pages or jobs requiring simple imposition may be worked on by the pupil.

**Third Month**—Instruction in press work. Care of press. Oiling, washing up. Practice in feeding press. Start with cards or stock that is easy to feed and run press without form. Nomenclature of principal parts of press.

**Fourth Month**—Press feeding. Insist on accuracy and not speed. Explain how speed hinders accuracy for a beginner. Getting each sheet right at 1000 impressions an hour is better than spoiling a large number of sheets and using throw-off half the time 1500 an hour.

**Seventeenth and Eighteenth Weeks**—Continuation of press feeding. Review of nomenclature, etc. Student should now be able to feed easy jobs fairly well.

## SECOND SEMESTER

**First Month**—General composition, locking up forms and feeding press. Learning to set guide pins. As pins are easily smashed quads will be found to be more satisfactory until student becomes proficient.

**Second Month**—Rudiments of make-ready for simple forms. Putting on tympan and setting guide pins. Figuring and cutting stock. Inspect each cut to avoid spoilage.

**Third Month**—General composition, lock-up and press work. Bindery work. Cutting stock.

**Fourth Month**—Same as third month. Cutting printed stock, tabbing and operation of stapling machine. Operation of punching machine.

**Seventeenth and Eighteenth Weeks**—General work around shop. Examination.

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NOTE: This character ( $\equiv/\equiv$ ) as used on pages 45, 46 and 47 should have been  $\neq$  and is the sign of inequality.













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